SPINNER || BROADCAST

Edition E | 2014

High Frequency Performance Worldwide

www.spinner-group.com

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Die aufgeführten technischen Daten und Abbildungen dienen zur Vorabinformation und werden erst bei schriftlicher Angebotsabgabe durch SPINNER bestätigt – Konstruktionsänderungen vorbehalten.

The specifications given here as well as the illustrations are for advance information. They shall only be confirmed by SPINNER‘s written offer and are subject to technical amendments.

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INHALTSVERZEICHNIS | CONTENTS

EXPLANATION OF THE MULTI CHANNEL COMBINER SPECIFICATIONS

Calculation of the maximum permissible output voltage

Various signals are added up within the combiner.
The peak voltages of the individual signal must be calculated and added up. The peak voltage must not be calculated from the combined power because this will result in a too low figure.
This sum must be less than the noted maximum output voltage. SPINNER recommends to keep a safety margin of 20%.

Calculation of the maximum permissible power at the narrow band inputs of starpoint, manifold or CIB combiner

The power is limited by the filters. The power ratings in the catalogue are always RMS figures. If the RMS figure of a signal is different from the nominal figure a correction factors must be applied (e.g. an analogue TX with 10/1 kW nominal power produces only 7 kW RMS power).
The RMS power specified in the data sheet can be applied. Only for adjacent channel operation a reduction may be necessary as explained below.

Calculation of the maximum permissible power at the wide band input of CIB combiners

The power ratings in the catalogue are always RMS figures. If the RMS figure of a signal is different from the nominal figure then correction factors must be applied (e.g. an analogue TX with 10/1 kW nominal power produces only 7 kW RMS power).

Typically the powers fed into the combiner inputs are different:

- only one transmitter is fed into the narrow band input
- the combined power of several transmitters is fed into the wide band input

In order to check if a CIB combiner model is suitable you must subtract 50% of the narrow band power from the maximum wide band power noted in the data sheet.
If the remainder is too small you must select a bigger combiner model.

Example:

Power at narrow band input in kW: ≤ 4.0
Power at wide band input in kW: ≤ 7.0

Possible combinations:

Narrow band input in kW:	*0*	*1.0*	*2.0*	*3.0*	*4.0*
Wide band input in kW:	*7.0*	*6.5*	*6.0*	*5.5*	*5.0*

SPINNER recommends to keep a safety margin of 20%.

Adjacent channel operation with CIB-Combiners

Only CIB combiners are suitable to combine adjacent channels or blocks.
The slope of the adjacent channel fed into the wide band input is not completely reflected by the band pass filters. A small part of the signal enters the filter and is converted to heat. This effect is called adjacent channel loss.
This load onto the band pass filters must be taken into account. For compensation the maximum permissible narrow band power must be reduced by 10 % - 30 % of the adjacent channel power fed into the wide band input.

Matching of CIB combiners outside the operating channels

To achieve best matching for the operating channels, non-used channels are handicapped. Therefore, please specify in the order all planned operating frequencies. The VSWR noted in the data sheet is guaranteed only for one channel per input.

Tuning specifications for filters and combiners

The filters must be tuned to the proper channel bandwidth (6, 7 or 8 MHz) and to satisfy the mask requirements.
The necessary information is defined in the tuning specifications (e.g. AS6148) which must be indicated with every order.
In the catalogue you can find filter data for the most common applications. However, alternative filter tunings can be made for other mask requirements, applications and bandwidths. Please do not hesitate to contact us.

BAND 3 COMBINERS

BAND 3 STRETCH LINE COMBINERS

Part number	Inputs	Channel spacing	Filters	Power per Input	Mask filtering
BN 57 46 81	2	≥ 2	–	≤ 2 kW	–

BAND 3 CIB COMBINERS WITHOUT MASK FILTERING

Part number	Channel spacing	Filters	NB power	WB power [1]	Mask filtering
BN 57 46 84 **BN 57 46 85**	≥ 2 ≥ 2	3/150 3/150	≤ 12 kW ≤ 12 kW	≤ 12 kW ≤ 30 kW	- -
BN 57 49 45 **BN 57 49 46**	≥ 1 ≥ 1	4/150 4/150	≤ 12 kW ≤ 12 kW	≤ 12 kW ≤ 30 kW	- -

BAND 3 DAB STARPOINT COMBINERS (1.54 MHZ BLOCK WIDTH)

Part number	Block spacing	Filters	NB power	Mask filtering
BN 57 49 04	≥ 1	6/100	≤ 0.5 kW	DAB or T-DMB
BN 57 46 17	≥ 1	6/150	≤ 1.5 kW	DAB or T-DMB
BN 57 46 80	≥ 1	6/150	≤ 1.6 kW	DAB or T-DMB

BAND 3 DAB CIB COMBINERS (1.54 MHZ BLOCK WIDTH)

Part number	Block spacing	Filters	NB power	WB power [1]	Mask filtering
BN 57 49 29 **BN 57 49 69**	≥ 0 ≥ 0	6/100 6/100	≤ 1 kW ≤ 1 kW	≤ 3 kW ≤ 3 kW	DAB or T-DMB DAB or T-DMB
BN 57 49 94 **BN 57 49 96**	≥ 0 ≥ 0	6/150 6/150	≤ 3 kW ≤ 3 kW	≤ 14 kW ≤ 30 kW	DAB or T-DMB DAB or T-DMB
BN 57 49 18 **BN 57 49 16**	≥ 0 ≥ 0	6/150 6/150	≤ 3.2 kW ≤ 3.2 kW	≤ 14 kW ≤ 30 kW	DAB or T-DMB DAB or T-DMB
BN 57 49 19 **BN 57 49 25**	≥ 0 ≥ 0	8/150 8/150	≤ 3.2 kW ≤ 3.2 kW	≤ 14 kW ≤ 30 kW	DAB or T-DMB DAB or T-DMB
BN 57 49 90	≥ 0	6/200	≤ 6 kW	≤ 30 kW	DAB or T-DMB
BN 57 49 92 **BN 57 46 91** **BN 57 46 90**	≥ 0 ≥ 0 ≥ 0	6/200 6/200LC 6/200	≤ 6.0 kW ≤ 10.2 kW ≤ 6.0 kW	≤ 14 kW ≤ 14 kW ≤ 30 kW	DAB or T-DMB DAB or T-DMB DAB or T-DMB
BN 57 49 07 **BN 57 46 97** **BN 57 46 48**	≥ 0 ≥ 0 ≥ 0	8/200 8/200LC 8/200	≤ 6.2 kW ≤ 10.2 kW ≤ 6.2 kW	≤ 14 kW ≤ 14 kW ≤ 30 kW	DAB or T-DMB DAB or T-DMB DAB or T-DMB

BAND 3 DTV STARPOINT COMBINERS

Part number	Block spacing	Filters	NB power	Mask filtering
BN 57 46 69	≥ 1	6/100	≤ 1.1 kW	DTV

BAND 3 DTV CIB COMBINERS

Part number	Block spacing	Filters	NB power	WB power[1]	Mask filtering
BN 57 46 68	≥ 0	6/100	≤ 2.2 kW	≤ 3 kW	DTV
BN 57 49 36 **BN 57 49 38**	≥ 0 ≥ 0	6/150 6/150	≤ 8 kW ≤ 8 kW	≤ 14 kW ≤ 30 kW	DTV DTV
BN 57 46 86 **BN 57 46 87**	≥ 0 ≥ 0	8/150 8/150	≤ 7 kW ≤ 7 kW	≤ 14 kW ≤ 30 kW	DTV DTV

[1] Attention: The power at the **W**ide **B**and input must be reduced by 50 % of the power fed into the **N**arrow **B**and input
[2] Attention: The output power must not be exceeded

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UHF COMBINERS

UHF STRETCH LINE COMBINERS

Part number	Inputs	Channel spacing	Filters	Power per input	Mask filtering
BN 57 49 31	2	≥ 3	-	≤ 800W	-
BN 57 46 34	2	≥ 3	-	≤ 7 kW	-
BN 57 46 35	2	≥ 3	-	≤ 17.5 kW	-
BN 57 46 36	2	≥ 3	-	≤ 23 kW	-
BN 57 46 37	2	≥ 3	-	≤ 37 kW	-

UHF STARPOINT COMBINERS

Part number	Inputs	Channel spacing	Filters	NB power	Mask filtering
BN 57 46 55	2	≥ 1	6/38	≤ 100 W	DTV
BN 57 46 10	2	≥ 1	6/150	≤ 2.5 kW	DTV
BN 57 46 11	3	≥ 1	6/150	≤ 2.5 kW	DTV
BN 57 46 12	2	≥ 1	8/150	≤ 2 kW	DTV
BN 57 46 13	3	≥ 1	8/150	≤ 2 kW	DTV

UHF MANIFOLD LOW POWER COMBINERS

Part number	Inputs	Channel spacing	Filters	NB power	Output power [2]	Mask filtering
BN 57 45 82	2	≥ 2	4/34	≤ 50 W	-	-
BN 57 45 83	3	≥ 2	4/34	≤ 50 W	-	-
BN 57 45 84	4	≥ 2	4/34	≤ 50 W	-	-
BN 57 45 85	5	≥ 2	4/34	≤ 50 W	-	-
BN 57 45 86	6	≥ 2	4/34	≤ 50 W	-	-
BN 57 45 87	7	≥ 2	4/34	≤ 50 W	-	-
BN 57 45 88	8	≥ 2	4/34	≤ 50 W	-	-
BN 57 45 89	9	≥ 2	4/34	≤ 50 W	-	-
BN 57 55 62	2	≥ 1	6/60	≤ 130 W	-	DTV
BN 57 55 63	3	≥ 1	6/60	≤ 130 W	≤ 600 W	DTV
BN 57 55 64	4	≥ 1	6/60	≤ 130 W	≤ 600 W	DTV
BN 57 55 65	5	≥ 1	6/60	≤ 130 W	≤ 600 W	DTV
BN 57 55 66	6	≥ 1	6/60	≤ 130 W	≤ 600 W	DTV
BN 57 55 67	7	≥ 1	6/60	≤ 130 W	≤ 600 W	DTV
BN 57 55 68	8	≥ 1	6/60	≤ 130 W	≤ 600 W	DTV
BN 57 49 12	2	≥ 1	6/84	≤ 750 W	-	DTV
BN 57 49 13	3	≥ 1	6/84	≤ 750 W	-	DTV
BN 57 49 14	4	≥ 1	6/84	≤ 750 W	-	DTV
BN 57 49 11	5	≥ 1	6/84	≤ 750 W	-	DTV
BN 57 49 22	2	≥ 1	8/84	≤ 750 W	-	DTV
BN 57 49 23	3	≥ 1	8/84	≤ 750 W	-	DTV
BN 57 49 24	4	≥ 1	8/84	≤ 750 W	-	DTV
BN 57 49 21	5	≥ 1	8/84	≤ 750 W	-	DTV

[1] Attention: The power at the **W**ide **B**and input must be reduced by 50 % of the power fed into the **N**arrow **B**and input
[2] Attention: The output power must not be exceeded

UHF COMBINERS

UHF CIB COMBINERS IN 19" DESIGN AND MINI CCS

Part number	Channel spacing	Filters	NB power	WB power [1]	Mask filtering
BN 57 46 05	≥ 1	4/34	≤ 100 W	≤ 600 W	-
BN 57 46 06 **BN 57 49 06**	≥ 0 ≥ 0	6/38 6/38	≤ 150 W ≤ 200 W	≤ 1 kW ≤ 1 kW	DTV DTV
BN 57 55 01	≥ 0	6/40	≤ 260 W	≤ 1 kW	DTV
BN 57 55 06	≥ 0	8/40	≤ 240 W	≤ 1 kW	DTV
BN 57 49 48 **BN 57 49 49**	≥ 0 ≥ 0	6/60 6/60	≤ 750 W ≤ 750 W	≤ 1 kW ≤ 4 kW	DTV DTV
BN 57 49 50 **BN 57 49 51**	≥ 0 ≥ 0	8/60 8/60	≤ 750 W ≤ 750 W	≤ 1 kW ≤ 4 kW	DTV DTV
BN 57 46 03 **BN 57 49 01** **BN 57 46 73** **BN 57 46 74**	≥ 1 ≥ 1 ≥ 1 ≥ 1	4/84 4/84 4/84 4/84	≤ 1.5 kW ≤ 1.5 kW ≤ 1.5 kW ≤ 2.5 kW	≤ 1 kW ≤ 7 kW ≤ 7 kW ≤ 7 kW	- - - -
BN 57 46 41 **BN 57 49 42** **BN 57 46 75** **BN 57 46 76**	≥ 0 ≥ 0 ≥ 0 ≥ 0	6/84 6/84 6/84 6/84	≤ 1.5 kW ≤ 1.5 kW ≤ 1.5 kW ≤ 1.5 kW	≤ 1 kW ≤ 7 kW ≤ 7 kW ≤ 7 kW	DTV DTV DTV DTV
BN 57 46 43 **BN 57 49 44** **BN 57 46 77** **BN 57 46 78**	≥ 0 ≥ 0 ≥ 0 ≥ 0	8/84 8/84 8/84 8/84	≤ 1.5 kW ≤ 1.5 kW ≤ 1.5 kW ≤ 1.5 kW	≤ 1 kW ≤ 7 kW ≤ 7 kW ≤ 7 kW	DTV DTV DTV DTV

UHF HIGH POWER CIB COMBINERS

Part number	Channel spacing	Filters	NB power	WB power [1]	Mask filtering
BN 57 55 11 **BN 57 55 12** **BN 57 55 13**	≥ 0 ≥ 0 ≥ 0	6/120 6/120 6/120	≤ 3.2 kW ≤ 3.2 kW ≤ 3.2 kW	≤ 7.0 kW ≤ 7.0 kW ≤ 17.5 kW	DTV DTV DTV
BN 57 55 15 **BN 57 55 16** **BN 57 55 17**	≥ 0 ≥ 0 ≥ 0	8/120 8/120 8/120	≤ 3.2 kW ≤ 3.2 kW ≤ 3.2 kW	≤ 7.0 kW ≤ 7.0 kW ≤ 17.5 kW	DTV DTV DTV
BN 57 49 02 **BN 57 49 32** **BN 57 49 33**	≥ 1 ≥ 1 ≥ 1	4/150 4/150 4/150	≤ 7 kW ≤ 7 kW ≤ 7 kW	≤ 7.0 kW ≤ 17.5 kW ≤ 33.0 kW	- - -
BN 57 46 72 **BN 57 46 62**	≥ 0 ≥ 0	6/150 6/150	≤ 4 kW ≤ 4 kW	≤ 7.0 kW ≤ 17.5 kW	ATSC ATSC
BN 57 49 47 **BN 57 49 34** **BN 57 49 35**	≥ 0 ≥ 0 ≥ 0	6/150 6/150 6/150	≤ 5 kW ≤ 5 kW ≤ 5 kW	≤ 7.0 kW ≤ 17.5 kW ≤ 33.0 kW	DTV DTV DTV
BN 57 49 62 **BN 57 49 61** **BN 57 49 63**	≥ 0 ≥ 0 ≥ 0	8/150 8/150 8/150	≤ 4 kW ≤ 4 kW ≤ 4 kW	≤ 7.0 kW ≤ 17.5 kW ≤ 33.0 kW	DTV DTV DTV

[1] Attention: The power at the **W**ide **B**and input must be reduced by 50 % of the power fed into the **N**arrow **B**and input
[2] Attention: The output power must not be exceeded

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UHF COMBINERS

UHF HIGH POWER CIB COMBINERS

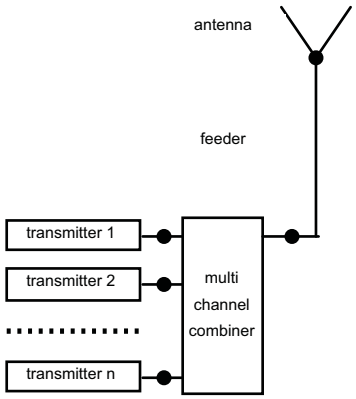
Part number	Channel spacing	Filters	NB power	WB power [1]	Mask filtering
BN 57 55 20	≥ 0	6/170	≤ 7 kW	≤ 7 kW	DTV
BN 57 55 21	≥ 0	6/170	≤ 7 kW	≤ 17.5 kW	DTV
BN 57 55 22	≥ 0	6/170	≤ 7 kW	≤ 33 kW	DTV
BN 57 55 23	≥ 0	6/170	≤ 7 kW	≤ 60 kW	DTV
BN 57 55 25	≥ 0	8/170	≤ 7 kW	≤ 7 kW	DTV
BN 57 55 26	≥ 0	8/170	≤ 7 kW	≤ 17.5 kW	DTV
BN 57 55 27	≥ 0	8/170	≤ 7 kW	≤ 33 kW	DTV
BN 57 55 28	≥ 0	8/170	≤ 7 kW	≤ 60 kW	DTV
BN 57 42 30	≥ 2	3/200	≤ 7 kW	≤ 7 kW	-
BN 57 42 29	≥ 2	3/200	≤ 7 kW	≤ 17,5 kW	-
BN 57 42 26	≥ 2	3/200	≤ 7 kW	≤ 33 kW	-
BN 57 42 83	≥ 2	3/200	≤ 20 kW	≤ 17.5 kW	-
BN 57 42 81	≥ 2	3/200	≤ 20 kW	≤ 33 kW	-
BN 57 42 86	≥ 2	3/200	≤ 20 kW	≤ 60 kW	-
BN 57 49 76	≥ 1	4/200	≤ 7 kW	≤ 33 kW	-
BN 57 49 73	≥ 1	4/200	≤ 15 kW	≤ 17.5 kW	-
BN 57 49 75	≥ 1	4/200	≤ 15 kW	≤ 33 kW	-
BN 57 49 85	≥ 1	4/200	≤ 15 kW	≤ 60 kW	-
BN 57 49 70	≥ 1	6/200	≤ 7 kW	≤ 17.5 kW	ATSC
BN 57 46 71	≥ 1	6/200	≤ 9 kW	≤ 17.5 kW	ATSC
BN 57 46 70	≥ 1	6/200LC	≤ 20 kW	≤ 17.5 kW	ATSC
BN 57 46 93	≥ 0	6/200	≤ 7 kW	≤ 7 kW	DTV
BN 57 46 94	≥ 0	6/200	≤ 7 kW	≤ 17.5 kW	DTV
BN 57 46 95	≥ 0	6/200	≤ 7 kW	≤ 33 kW	DTV
BN 57 46 96	≥ 0	6/200	≤ 7 kW	≤ 60 kW	DTV
BN 57 49 28	≥ 0	6/200	≤ 10 kW	≤ 17.5 kW	DTV
BN 57 49 67	≥ 0	6/200	≤ 10 kW	≤ 33 kW	DTV
BN 57 49 00	≥ 0	6/200	≤ 10 kW	≤ 60 kW	DTV
BN 57 46 98	≥ 0	6/200LC	≤ 23 kW	≤ 17.5 kW	DTV
BN 57 49 71	≥ 0	6/200LC	≤ 23 kW	≤ 33 kW	DTV
BN 57 49 74	≥ 0	6/200LC	≤ 23 kW	≤ 60 kW	DTV
BN 57 49 40	≥ 0	8/200	≤ 7 kW	≤ 7 kW	DTV
BN 57 49 39	≥ 0	8/200	≤ 7 kW	≤ 17.5 kW	DTV
BN 57 49 37	≥ 0	8/200	≤ 7 kW	≤ 33 kW	DTV
BN 57 49 88	≥ 0	8/200	≤ 7 kW	≤ 60 kW	DTV
BN 57 49 65	≥ 0	8/200	≤ 8 kW	≤ 17.5 kW	DTV
BN 57 49 66	≥ 0	8/200	≤ 8 kW	≤ 33 kW	DTV
BN 57 49 91	≥ 0	8/200	≤ 8 kW	≤ 60 kW	DTV
BN 57 49 64	≥ 0	8/200LC	≤ 23 kW	≤ 17.5 kW	DTV
BN 57 49 89	≥ 0	8/200LC	≤ 23 kW	≤ 33 kW	DTV
BN 57 49 79	≥ 0	8/200LC	≤ 23 kW	≤ 50 kW	DTV
BN 57 55 30	≥ 0	6/230	≤ 17 kW	≤ 17.5 kW	DTV
BN 57 55 31	≥ 0	6/230	≤ 17 kW	≤ 33 kW	DTV
BN 57 55 32	≥ 0	6/230	≤ 17 kW	≤ 60 kW	DTV
BN 57 55 33	≥ 0	6/230	≤ 17 kW	≤ 60 kW	DTV
BN 57 55 40	≥ 0	6/230LC	≤ 23 kW	≤ 17.5 kW	DTV
BN 57 55 41	≥ 0	6/230LC	≤ 23 kW	≤ 33 kW	DTV
BN 57 55 42	≥ 0	6/230LC	≤ 23 kW	≤ 60 kW	DTV
BN 57 55 43	≥ 0	6/230LC	≤ 23 kW	≤ 80 kW	DTV
BN 57 55 35	≥ 0	8/230	≤ 17 kW	≤ 17.5 kW	DTV
BN 57 55 36	≥ 0	8/230	≤ 17 kW	≤ 33 kW	DTV
BN 57 55 37	≥ 0	8/230	≤ 17 kW	≤ 60 kW	DTV
BN 57 55 38	≥ 0	8/230	≤ 17 kW	≤ 60 kW	DTV
BN 57 55 45	≥ 0	8/230LC	≤ 23 kW	≤ 17.5 kW	DTV
BN 57 55 46	≥ 0	8/230LC	≤ 23 kW	≤ 33 kW	DTV
BN 57 55 47	≥ 0	8/230LC	≤ 23 kW	≤ 60 kW	DTV
BN 57 55 48	≥ 0	8/230LC	≤ 23 kW	≤ 80 kW	DTV

[1] Attention: The power at the **W**ide **B**and input must be reduced by 50 % of the power fed into the **N**arrow **B**and input
[2] Attention: The output power must not be exceeded

CHANNEL COMBINERS

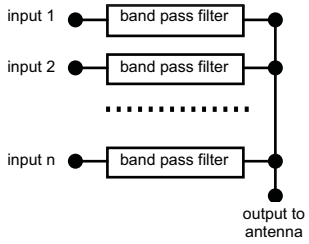
Multi channel combiners

In order to broadcast more transmitters via a common antenna it is necessary to connect the transmitter outputs via a combiner in such a way that they do not interfere (isolation) and to guide the whole RF power to the antenna (insertion loss). Band pass filters or phase adjusted transmission lines are used in the combiners as frequency determining devices.
The band pass filters can additionally be used to suppress spurious emissions (integrated mask filtering for DTV, DAB, T-DMB, ...).



Starpoint or manifold combiners

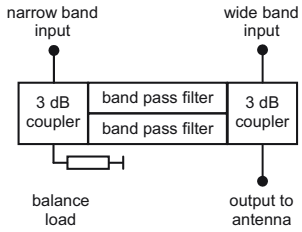
The transmitters can be isolated from each other by connecting a band pass filter to every output. The outputs of these filters must be connected via a proper matching network to achieve good matching for the operating channels.
This system will show total mismatch outside the operating channels because of the total reflection at the band pass filters.
Frequency changes or extensions are difficult with such combiners, because the matching networks must be optimized to the new frequencies.



Constant Impedance Broadband (CIB) combiners

Good isolation, broadband matching and ease of modifications are achieved in the CIB combiner by a tricky combination of band pass filters and 3 dB couplers.

The signal applied to the narrow band input is fed via the narrow band 3 dB coupler into the two band pass filters and is combined afterwards in the wide band 3 dB coupler and routed to the antenna output.
The signals fed into the wide band input go to the filter ports via the wide band 3 dB coupler where they are totally reflected back to the wide band coupler and routed to the antenna output.
All ports are broadband matched (Constant Impedance Broadband).
Any transmitter signal can be fed into the wide band input as long as the frequency spacing to the pass band range of the filters is big enough to get total reflection. Even adjacent channels can be combined if the slopes of the filter curves are steep enough.
The CIB combiners are preferred components for the design of multi channel combiners because they offer most flexibility for any configuration of channels and powers.



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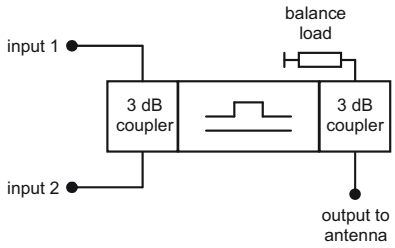
CHANNEL COMBINERS

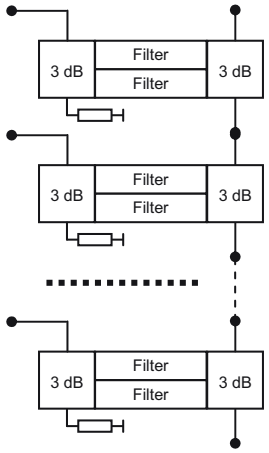
Stretch line combiners

The difference in wave length of the transmitter frequencies is used with the stretch line combiner. The signals are split by the first 3 dB coupler to two transmission lines. The phases at the input of the second 3 dB coupler are modified by careful adjustment of the line lengths in such a way that all signals are routed to the antenna output.
The stretch line combiner has very low insertion loss and high power rating but can combine only channels with more than 3 channels spacing.

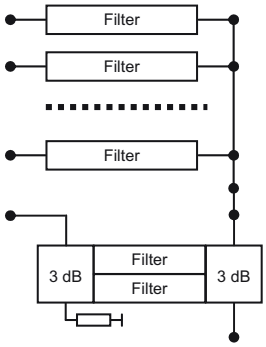


Combination of several combiners

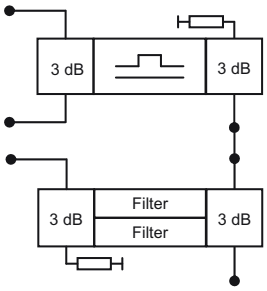
CIB combiners may be cascaded nearly arbitrarily. Additional units can be connected to the wide band input or the output. Starpoint, manifold or stretch line combiners may be connected to the wide band input of CIB combiners to add further channels.



chain of CIB combiners



manifold and CIB combiner



stretch line and CIB combiner

How to select the proper combiner?

Start by making a list of channels, powers and mask requirements:

Channel	Power	Mask requirement
23	2 kW	DVB
27	2 kW	DVB
28	10 kW	no
57	1 kW	DVB

If the list contains adjacent channels they must be combined using CIB combiners.
If mask filters are necessary it is preferable to integrate them into the starpoint or manifold or CIB combiners because this gives the benefit of minimum overall insertion loss and maximum freedom for channel combinations.
Stretch line combiners and the wide band input of CIB combiners do not provide mask filtering. Therefore, proper band pass filters must be connected to the inputs to satisfy the mask requirements.
After selecting the combiner design (CIB or star point or manifold or stretch line) you must select a model with sufficient power rating.

The combiner engineers from SPINNER will be pleased to support you with the selection and planning of combiner systems. Please send the table with channels and specifications to: info@spinner-group.com

SOLUTIONS FOR LOW AND MEDIUM POWER COMBINERS

SPINNER offers a complete range of low and medium power combiners:
- 1 W up to 5 kW
- Band 3, UHF and Band L
- ATV, DAB and DTV

All designs are available:
- stretch line combiners without mask filtering
- starpoint combiners made of DAB and DTV mask filters
- manifold combiners with and without DTV mask filtering
- CIB combiners with and without DAB or DTV mask filtering

The compact combiners can be installed:
- inside 19" racks
- wall mount
- floor mount

Multiple combiner units can be stacked vertically inside a 19" rack or self supporting or be fixed with wall mounts to minimize foot print.

The 19" slide-in combiners are available in three versions:
- BN 57____ without front plate
- BN 57____C0001 with front plate, RF ports at the front side
- BN 57____C0002 with front plate, RF ports at the rear side

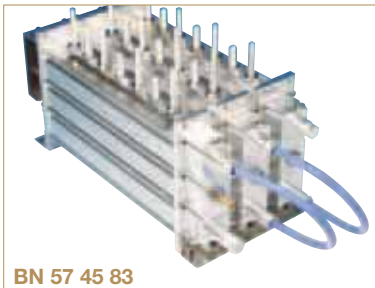
All SPINNER combiner systems consisting of multiple units are assembled, tuned and measured in the factory before shipping. SPINNER is shipping complete systems which can be easily installed by any skilled installer.
Thus the customer gets complete test results of insertion loss, mask filtering and matching which can be checked before starting the installation and compared afterwards with the on site results.

BN 57 46 05 C0001
UHF CIB combiner with 4 cavity filters

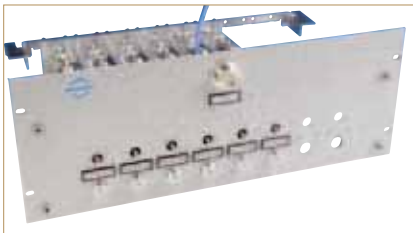
BN 57 46 06 C0001
UHF CIB combiner with DTV mask filter

BN 57 49 48 C0002
UHF CIB combiner with DTV mask filters

BN 57 49 42 C0001
UHF CIB combiner with DTV mask filters



BN 57 45 83
UHF 3-way manifold combiner



BN 57 45 86
UHF 6-way manifold combiner

BN 57 48 39
UHF 3-way combiner with integrated DTV mask filters and monitoring

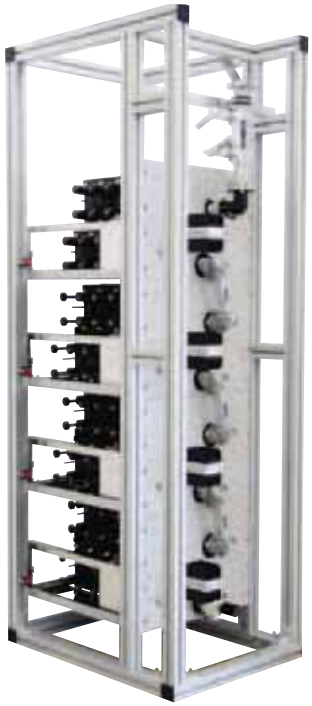
Data subject to change without notice – Edition E

SOLUTIONS FOR LOW AND MEDIUM POWER COMBINERS

BN 57 45 90
UHF 4-way CIB combiner
in wall mount

BN 57 48 78
UHF 6-way combiner
with integrated DTV mask filters

BN 57 54 81
Band 3 4-way combiner
with integrated DAB mask filters



BN 57 52 72
5-way combiner
with integrated DTV mask filters

BN 57 56 23 C1000
Double UHF 6-way combiner
with integrated DTV mask filters
and N+1 switching system

BN 57 45 98
Double UHF 6-way combiner
with integrated DVB mask filters

SOLUTIONS FOR COMPACT COMBINING & SWITCHING SYSTEM 1 KW - 80 KW

Modular system of combiners and patch panels to implement all functions with minimum foot print

SPINNER has standardized and minimized the combiners and patch panels so much that a half square meter footprint per channel is sufficient to realize the combination, mask filtering and many switching functions. This design is called **CCS** and has many advantages:

- The combiner planning is very simple because only 0.5 m^2 are sufficient per channel.
- The DTV mask filtering (uncritical or critical) can be integrated into the **CCS** combiner module without increasing the foot print.
- **CCS** combiner modules are available for up to 80 kW combined power in one output. For higher powers parallel, phase equalized combiner chains can be made.
- **CCS** systems can be equipped with monitoring couplers, trimming lines and other accessories.
- The installation is very simple because the **CCS** modules are delivered as individual units which can be handled easily. On site the combiner modules only need to be fixed to the bottom frame and connected with the prefabricated rigid lines to be ready for operation. Thus, even complicated combiner systems can be installed within one day.
- The installation of the interconnection lines to the transmitters and the antenna is simple, quick and cheap because all RF ports are free upwards. So one vertical piece of rigid line is sufficient per port.
- The optional **CCS** patch panels allow reserve operation facilities, bypassing of individual combiner modules, switching to a common dummy load and precise measurement of the combiner performance without dismantling rigid lines.
- The off-air periods for frequency changes and other modifications can be reduced to minutes if **CCS** patch panels are used.
- The standardization even allows the replacement of combiner modules for later changes to adjacent channel operation or increases of transmitter power.

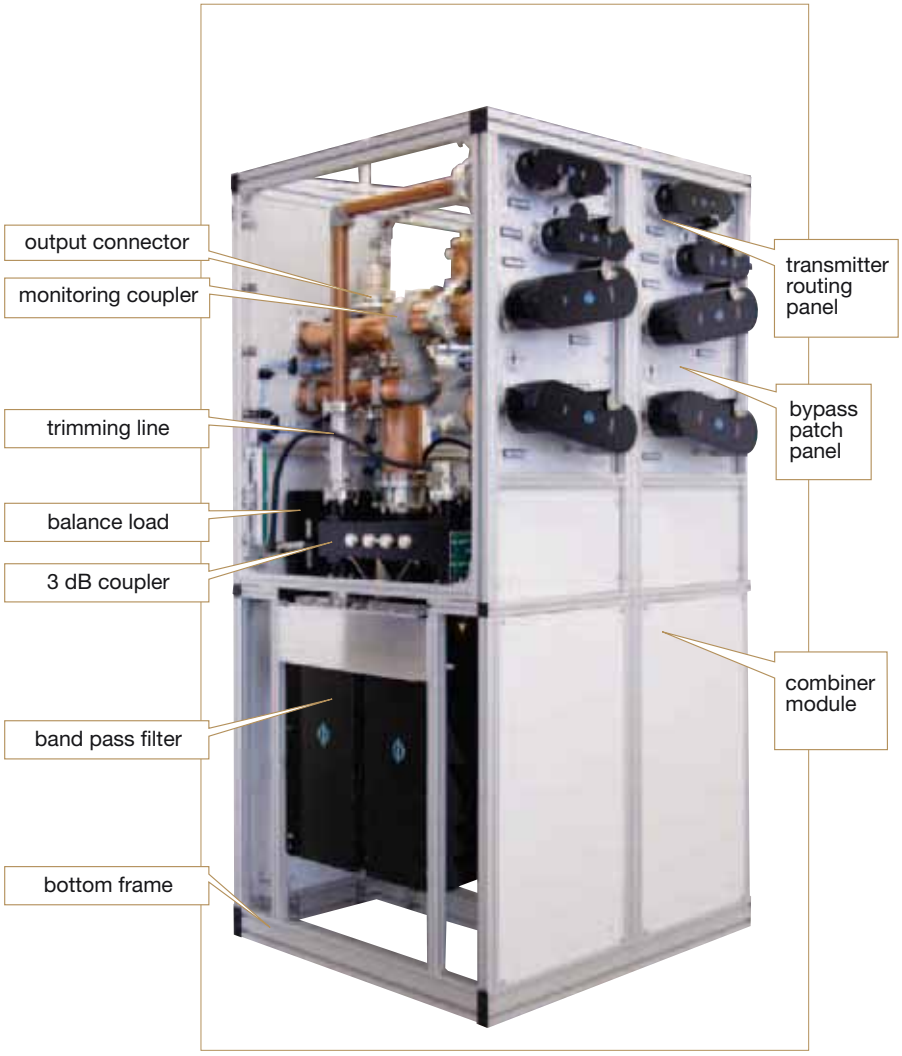
The SPINNER **CCS** systems offers the network operator enormous advantages in planning, installation, operation and future expansion which should be taken into account in comparison with the competition.

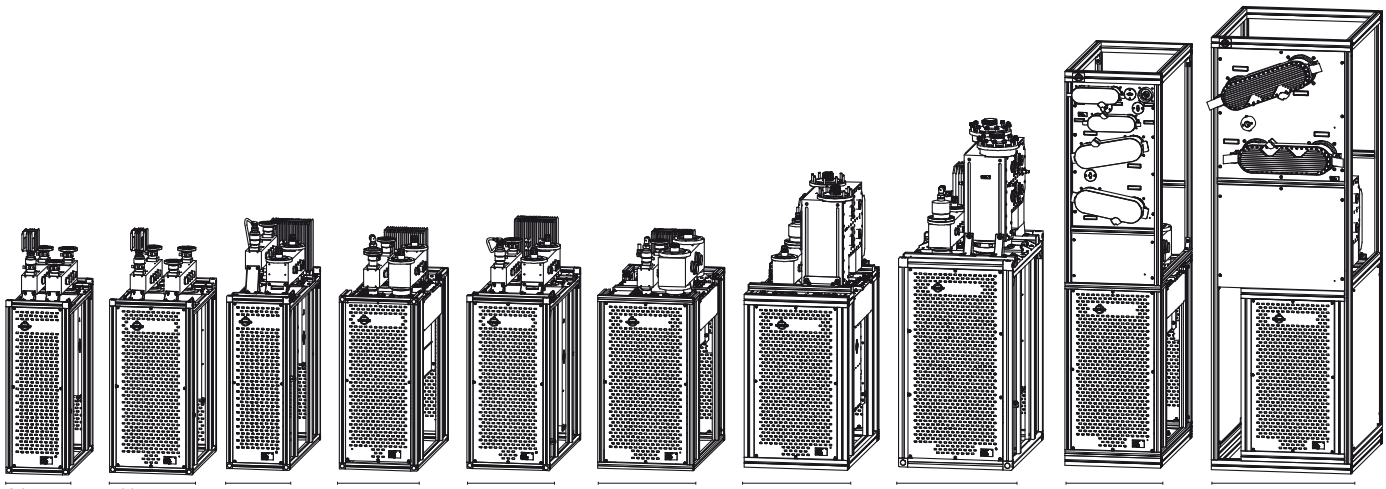
testing in the factory

transportation

ready for operation on site

SOLUTIONS FOR COMPACT COMBINING & SWITCHING SYSTEM 1 KW - 80 KW

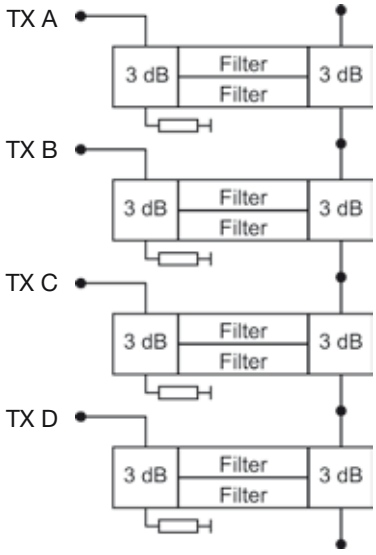




SOLUTIONS FOR COMPACT COMBINING & SWITCHING SYSTEM 1 KW - 80 KW

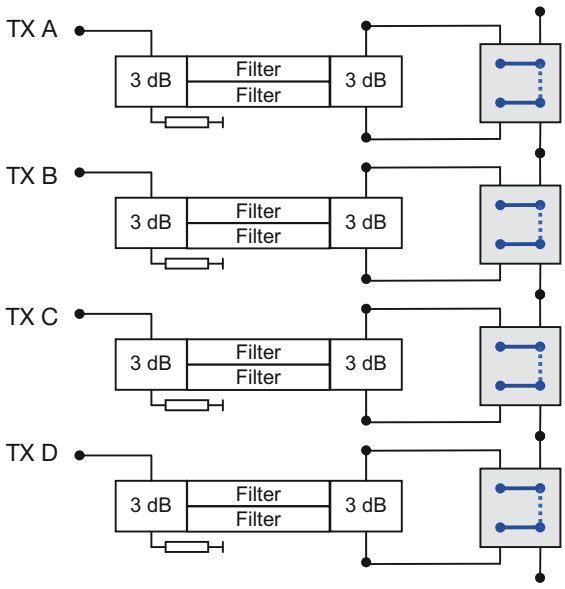
CCS combiner system without patch panels - minimum configuration

For a straightforward system the combiner modules can be connected via simple rigid lines. Such a system is very efficient but any measurements or modification will require interruption of transmission.



CCS combiner system with combiner bypass patch panels for increased availability

To increase the availability of the combiner system every combiner module is equipped with a 4 port patch panel in such a way that any combiner can be bypassed within minutes to be free for measurements or frequency changes.
The transmission of the remaining channels can continue within minutes and even the bypassed channel can be transmitted by feeding it into the free wide band input.



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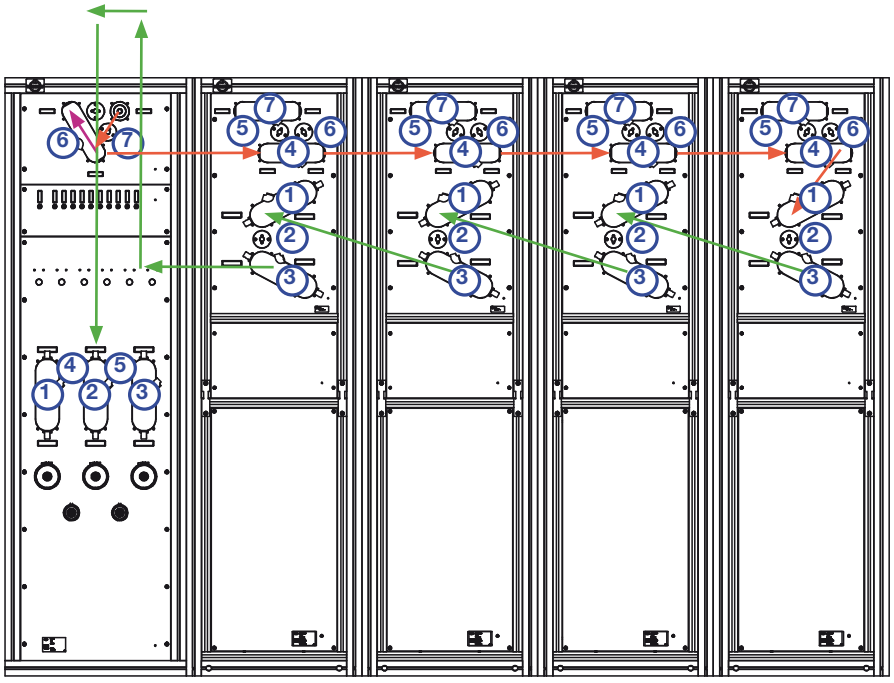
SOLUTIONS FOR COMPACT COMBINING & SWITCHING SYSTEM 1 KW - 80 KW

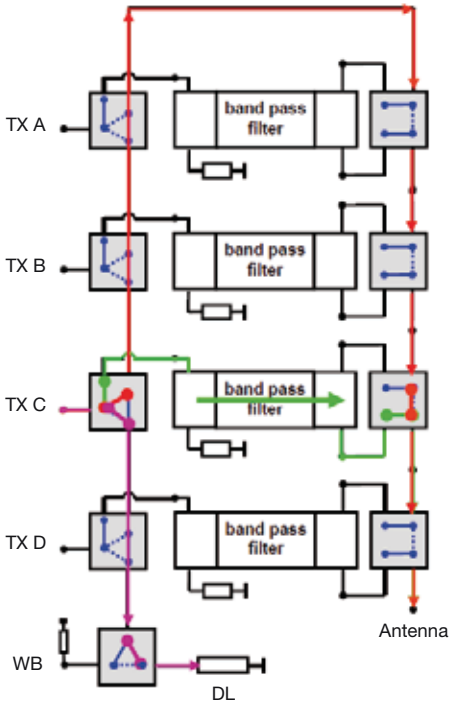
CCS combiner system with transmitter routing and combiner bypassing patch panels for maximum flexibility

For maximum flexibility the combiner module can be equipped with 4 port patch panels at the input and the output side:

Transmitter routing at the input side:
- For normal operation the transmitter is directly connected to the combiner input.
- For measurements the transmitter signal can be switched to a common dummy load.
- For frequency changes the transmitter can be switched to the wide band input of the combiner system to continue operation while the combiner unit is retuned.

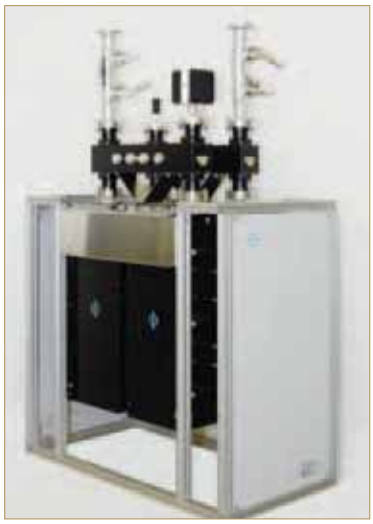
Combiner bypassing at the output side:
- For normal operation the module is in the combiner chain.
- For measurements or frequency changes the combiner module is bypassed and isolated.





—	Standard operation:	Transmitter via combiner to antenna
—	Measurement of transmitter:	Transmitter routed to common dummy load
—	Combiner measurement or retuning:	Operation is continued via the wide band input of the system while the combiner module is bypassed

SOLUTIONS FOR COMPACT COMBINING & SWITCHING SYSTEM 1 KW - 80 KW



Single UHF CIB combiner unit

BN 57 54 02 Rennes, France
UHF combiner for 8 x 5.6 kW DVB
with integrated mask filters and monitoring couplers

BN 57 53 06 Turkmenistan
UHF combiner for 8 x 4 kW DVB with integrated mask filters, combiner bypass
and antenne patch panel with bent front for installation in circular transmitter hall

BN 57 52 65 Argentina
UHF combiner for 4 x 2 kW ISDB-T
(expandable to 8 x 2 kW) with integrated
8 cavity mask filter and N+1 switching
and dummy load for testing

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SOLUTIONS FOR COMPACT COMBINING & SWITCHING SYSTEM 1 KW - 80 KW

BN 57 54 96 Russia
UHF Combiner for 5 kW DVB with integrated mask filters and 20 kW ATV, combiner bypass and antenna patch panel and 10 kW dummy load

BN 57 56 26 Pfänder, Austria
Band 3 combiner for 5 x 2.5 kW DAB (expandable to 10 x 2.5 kW DAB) with integrated mask filters and antenna patch panel

BN 57 56 37 South Africa
UHF combiner for 3 x 3 kW DVB with integrated liquid cooled filters

BN 57 50 84 Pontop Pike, England
UHF combiner for 3 x 15 kW DVB with integrated liquid cooled filters, input isolation U-links and pump unit

BN 57 44 72 Knockmore, Scotland
Double UHF combiner for 6 x 1.7 kW DVB with integrated 8 MHz DVB mask filters 2 port input isolation patch panel

DESIGN AND OFFERS

A lot of knowledge and experience is necessary to design multichannel combiner systems with good technical and economical performance. The following aspects must be taken into account:

- power of the individual signals
- voltage of the individual signals
- frequency spacings (adjacent channels)
- requirements for mask filtering
- patch panels for emergency operation
- space consumption
- future frequency changes or extensions
- performance of combiners, patch panels, etc.

For the design of a complete transmitting station the specifications of the combiner system (insertion losses, matching) must be fixed in the planning stage.

SPINNER has a team of experienced RF engineers to design combiner systems.
Please send us your requirements. We will prepare an offer with detailed technical and mechanical specifications similar to the data sheet at the right page.

The complete combiners system is shown in the picture below.

Example:

UHF-Combiner for 3 x 5 kW DVB
for adjacent channel operation
with integrated 8 MHz DVB mask filters
4 port combiner bypass patch panels
4 port TX rerouting patch panels
6 port half antenna patch panel

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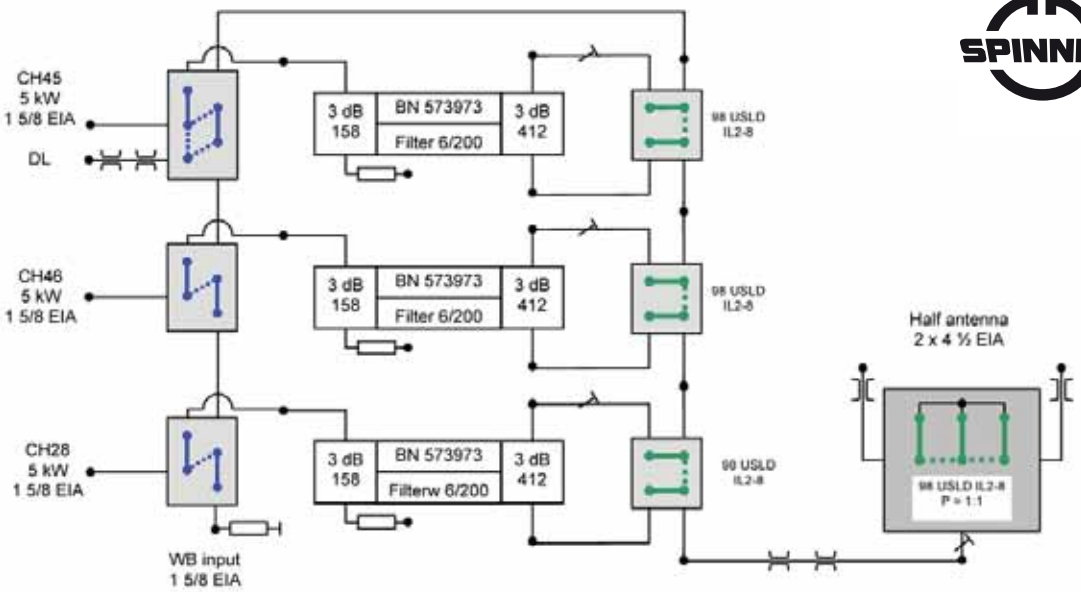
DESIGN AND OFFERS



monitoring couplers NB inputs:

reference frequency	center of channel
coupling forward	54 dB
coupling reflected	54 dB

(54 dB ≙ 13 dBm @ 5kW)

monitoring couplers outputs:

reference frequency	666 MHz
coupling forward	54 dB
coupling reflected	54 dB

(54 dB ≙ 13 dBm @ 5kW)

Mechanical Data							
Size (height x width x depth)	1,98 m x 2,29 m x 0,9 m						
Weight	appr. 1000 kg						
RF connectors inputs	1 5/8" EIA free upwards						
RF connectors antenna outputs	4 1/2" EIA free upwards						
Electrical Data of Antenna Patch Panel							
Frequency range	470 – 860 MHz						
Input Power	≤ 35 kW						
Peak voltage	19 kV						
Power splitter	P = 1:1, in phase						
Interlock loops	6 loops wired						
Electrical Data of Combiner							
channel	frequency in MHz	max. power in kW	filter tuning specification	insertion loss in dB (tolerance ± 0,05 dB)			max VSWR
				$f_{0-3,8\ MHz}$	f_0	$f_{0+3,8\ MHz}$	
28D	526 - 534	5	AS6006	0,90	0,40	0,90	1,06
45D	662- 670	5	AS6006	1,10	0,60	2,60	1,08
46D	670 - 678	5	AS6007	1,50	0,50	1,50	1,08
WB input		3 x 5			0,30 - 0,50		
Minimum channel spacing					≥ 0		
Isolation between inputs					> 40 ± 5 dB		
DVB Mask filtering					$f_{0\pm4,2\ MHz}$	$f_{0\pm6\ MHz}$	$f_{0\pm12\ MHz}$
		attenuation in dB			≥ 4	≥ 20	≥ 40

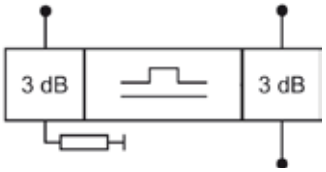
Scope of Supply

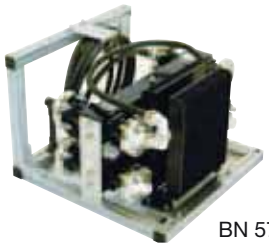
1	6 port antenna patch panel P=1:1
2	4+4 port combiner switching panel
1	4+5 port combiner switching panel
3	UHF CIB combiner 158-412 6/200
6	monitoring couplers
1	set of rigid lines

SB – Go	**UHF Combiner Mt. Grünten for 3 x 5 kW (expandable to 6 x 5 kW)** with uncritical DVB mask filtering of the narrow band inputs	**BN 574156** Version 1

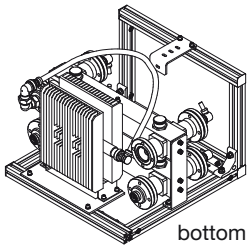
CCS BAND 3 STRETCHLINE COMBINERS

- compact design
- suitable for ATV and DTV
- for 6 and 7 MHz channel bandwidth

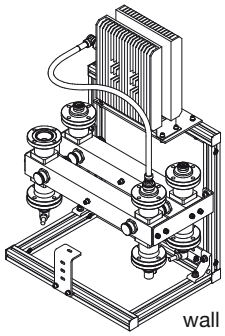




BN 57 46 81



bottom mounting

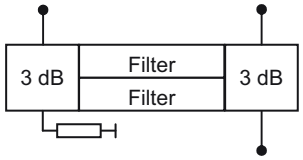


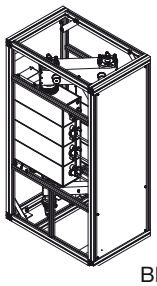
wall mounting

Part number	**BN 57 46 81**
Frequency range	174 - 240 MHz
Channel spacing	≥ 2
Narrow band inputs	7-16 female
Average input power	**≤ 2 kW**
Mask filtering	no
Insertion loss	typically ≤ 0,5 dB
Output	1 5/8“ EIA
Peak output voltage	≤ 3,5 kV
Isolation between inputs	≥ 32 dB
VSWR	≤ 1,06
Dimensions (L x W x H) mm	≈ 486 x 460 x 350
Weight	≈ 26 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products “

CCS BAND 3 CIB COMBINERS

- compact design
- suitable for ATV and DTV
- for 6 and 7 MHz channel bandwidth
- tuneable within the whole band 3 range
- temperature compensated



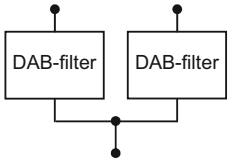


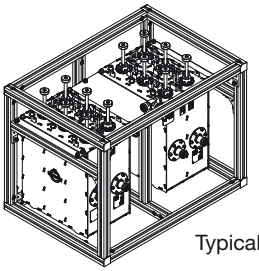
BN 57 49 46

Part number	BN 57 46 84	BN 57 46 85	BN 57 49 45	BN 57 49 46
Frequency range	174 - 230 MHz			
Channel spacing	≥ 2		≥ 1	
Narrow band input	1 5/8" EIA			
Filter type integrated	**3/150 ≡ BN617118**		**4/150 ≡ BN617119**	
Average input power	**≤ 12 kW**			
Mask filtering	no			
Insertion loss	AS3003 ≤ 0.15 dB		AS4004 ≤ 0.25 dB	
Wide band input	1 5/8" EIA	3 1/8" EIA male	1 5/8" EIA	3 1/8" EIA male
Average input power	≤ 12 kW	≤ 30 kW	≤ 12 kW	≤ 30 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input			
Mask filtering	no			
Insertion loss	≤ 0.05 dB			
Output	1 5/8" EIA	3 1/8" EIA male	1 5/8" EIA	3 1/8" EIA male
Peak output voltage	≤ 3.5 kV	≤ 12.7 kV	≤ 3.5 kV	≤ 12.7 kV
Isolation between inputs	≥ 35 dB			
VSWR	≤ 1.06			
Dimensions (L x W x H) mm	≈ 800 x 520 x 1420		≈ 800 x 520 x 1420	
Weight	≈ 115 kg		≈ 130 kg	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products"			

BAND 3 DAB STARPOINT COMBINERS

- compact design
- for 1.54 MHz block width
- integrated mask filters for DAB and T-DMB
- temperature compensated





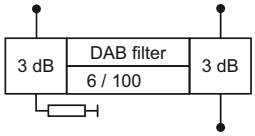
Typical design

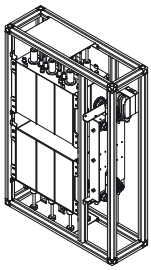
Part number	**BN 57 49 04 with cross coupling**	**BN 57 46 17 without cross coupling**	**BN 57 46 80 with cross coupling**	
Frequency range	174 - 240 MHz	170 - 240 MHz		
Block spacing	≥ 1			
Narrow band inputs	7-16 female			
Filter type integrated cavities/size	**6/100 ≡ BN 617116**	**6/150 ≡ BN 617171**	**6/150 ≡ BN 617144**	
Temperature stability	≤ 1 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz			
DAB and T-DMB Mask filtering	DAB / T-DMB @ 1.54 MHz ($\hat{U}/U_{rms}$=13 dB)			
Average input power	**≤ 600 W**	**≤ 1.5 kW**	**≤ 1.6 kW**	
Tuning instruction	AS6033	AS6010	AS6137	AS6149
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 1.0 dB f_0 ± 0.77 MHz ≤ 2.3 dB f_0 ± 0.97 MHz ≥ 15 dB f_0 ± 1.75 MHz ≥ 45 dB f_0 ± 2.2 MHz ≥ 53 dB f_0 ± 3.0 MHz ≥ 53 dB	f_0 ≤ 1.0 dB f_0 ± 0.77 MHz ≤ 1.6 dB f_0 ± 0.97 MHz ≥ 8 dB f_0 ± 1.75 MHz ≥ 43 dB f_0 ± 2.2 MHz ≥ 53 dB f_0 ± 3.0 MHz ≥ 73 dB	f_0 ≤ 0.75 dB f_0 ± 0.77 MHz ≤ 1.6 dB f_0 ± 0.97 MHz ≥ 15 dB f_0 ± 1.75 MHz ≥ 45 dB f_0 ± 2.2 MHz ≥ 58 dB f_0 ± 3.0 MHz ≥ 52 dB	≤ 0.65 dB ≤ 0.90 dB n.d. ≥ 15 dB ≥ 40 dB ≥ 50 dB
Group delay variation	Δτ ≤ 1200 ns	Δτ ≤ 700 ns	Δτ ≤ 1000 ns	Δτ ≤ 400 ns
Output	7-16 female	1 5/8" EIA		
Isolation between inputs	≥ 35 dB			
VSWR	≤ 1.2			
Dimensions (L x W x H) mm	550 x 448 x 500	750 x 550 x 750		
Weight	≈ 55 kg	≈ 90 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

Data subject to change without notice – Edition E

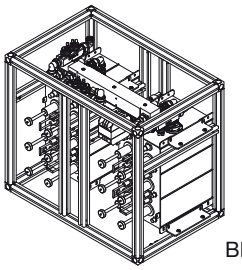
BAND 3 DAB CIB COMBINERS

- compact design
- for 1.54 MHz block width
- integrated mask filters for DAB and T-DMB
- adjacent block operation
- temperature compensated
- filters with cross coupling (notch function)





BN 57 49 69

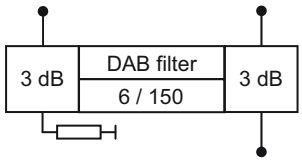


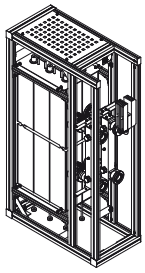
BN 57 49 29

Part number	**BN 57 49 69 CCS design**	**BN 57 49 29 19" design**
Frequency range	174 - 240 MHz	
Block spacing	≥ 0	
Narrow band input	7-16 female	
Filter type integrated cavities/size	**6/100 ≡ BN 617116**	
Temperature stability	≤ 1 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz	
DAB and T-DMB Mask filtering	DAB / T-DMB @ 1.54 MHz ($\hat{U}/U_{rms}$=13 dB)	
Average input power	**≤ 1.2 kW**	
Tuning instruction	AS6033	
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 1.0 dB f_0 ± 0.77 MHz ≤ 2.3 dB f_0 ± 0.97 MHz ≥ 15 dB f_0 ± 1.75 MHz ≥ 45 dB f_0 ± 2.2 MHz ≥ 53 dB f_0 ± 3.0 MHz ≥ 53 dB	
Group delay variation	Δτ ≤ 1200 ns	
Wide band input	7-16 female	
Average input power	≤ 3 kW Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input	
Mask filtering	no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output Peak output voltage	7-16 female ≤ 3.2 kV	
Isolation between inputs	≥ 35 dB	
VSWR	≤ 1.1	
Dimensions (L x W x H) mm	≈ 660 x 220 x 950	≈ 680 x 448 x 600
Weight	≈ 70 kg	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

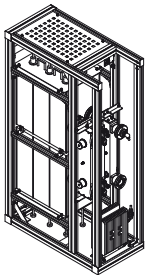
BAND 3 DAB CIB COMBINERS

- **CCS** compact design
- for 1.54 MHz block width
- integrated mask filters for DAB and T-DMB
- adjacent block operation
- temperature compensated
- filters without cross coupling (notch function)





BN 57 49 94

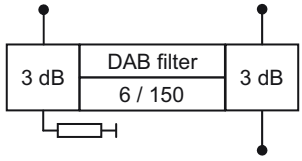


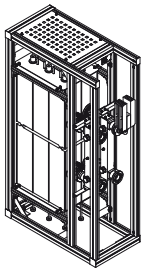
BN 57 49 96

Part number	**BN 57 49 94**	**BN 57 49 96**
Frequency range	170 - 240 MHz	
Block spacing	≥ 0	
Narrow band input	1 5/8" EIA	
Filter type integrated cavities/size	**6/150 ≡ BN 61 71 71**	
Temperature stability	≤ 1 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz	
DAB and T-DMB Mask filtering	DAB / T-DMB @ 1.54 MHz ($\hat{U}/U_{rms}$=13 dB)	
Average input power	**≤ 3 kW**	
Tuning instruction	AS6010	
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 1.0 dB f_0 ± 0.77 MHz ≤ 1.6 dB f_0 ± 0.97 MHz ≥ 8 dB f_0 ± 1.75 MHz ≥ 43 dB f_0 ± 2.2 MHz ≥ 53 dB f_0 ± 3.0 MHz ≥ 73 dB	
Group delay variation	Δτ ≤ 700 ns	
Wide band input	1 5/8" EIA	3 1/8" EIA male
Average input power	≤ 14 kW	≤ 30 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input	
Mask filtering	no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output Peak output voltage	1 5/8" EIA ≤ 7.7 kV	3 1/8" EIA male ≤ 12.7 kV
Isolation between inputs	≥ 35 dB	
VSWR	≤ 1.1	
Dimensions (L x W x H) mm	800 x 390 x 1420	
Weight	≈ 120 kg	≈ 130 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

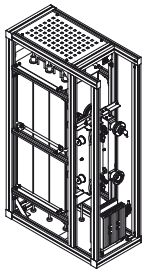
BAND 3 DAB CIB COMBINERS

- **CCS** compact design
- for 1.54 MHz block width
- integrated mask filters for DAB and T-DMB
- adjacent block operation
- temperature compensated
- filters with cross coupling (notch function)





BN 57 49 18

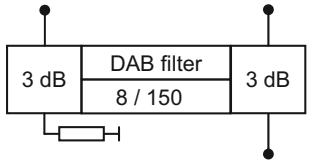


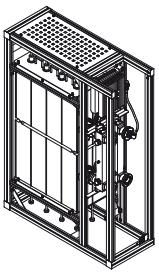
BN 57 49 16

Part number	**BN 57 49 18**	**BN 57 49 16**
Frequency range	170 - 240 MHz	
Block spacing	≥ 0	
Narrow band input	1 5/8" EIA	
Filter type integrated cavities/size	**6/150 ≡ BN 61 71 44**	
Temperature stability	≤ 1 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz	
DAB and T-DMB Mask filtering	DAB / T-DMB @ 1.54 MHz ($\hat{U}/U_{rms}$=13 dB)	
Average input power	**≤ 3.2 kW**	
Tuning instruction	AS6137	AS6149
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.75 dB f_0 ± 0.77 MHz ≤ 1.6 dB f_0 ± 0.97 MHz ≥ 15 dB f_0 ± 1.75 MHz ≥ 45 dB f_0 ± 2.2 MHz ≥ 58 dB f_0 ± 3.0 MHz ≥ 52 dB	f_0 ≤ 0.65 dB f_0 ± 0.77 MHz ≤ 0.90 dB f_0 ± 0.97 MHz n.d. f_0 ± 1.75 MHz ≥ 15 dB f_0 ± 2.2 MHz ≥ 40 dB f_0 ± 3.0 MHz ≥ 50 dB
Group delay variation	Δτ ≤ 1000 ns	Δτ ≤ 400 ns
Wide band input	1 5/8" EIA	3 1/8" EIA male
Average input power	≤ 14 kW	≤ 30 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input	
Mask filtering	no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output Peak output voltage	1 5/8" EIA ≤ 7.7 kV	3 1/8" EIA male ≤ 12.7 kV
Isolation between inputs	≥ 35 dB	
VSWR	≤ 1.1	
Dimensions (L x W x H) mm	800 x 390 x 1420	
Weight	≈ 120 kg	≈ 130 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

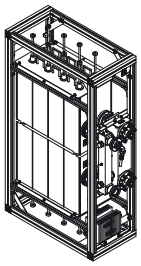
BAND 3 DAB CIB COMBINERS

- **CCS** compact design
- for 1.54 MHz block width
- integrated mask filters for DAB and T-DMB
- adjacent block operation
- temperature compensated
- filters with cross coupling (notch function)





BN 57 49 19

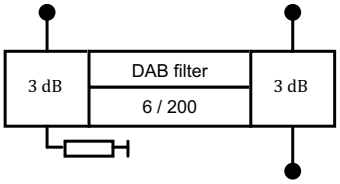


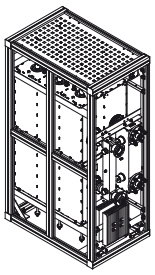
BN 57 49 25

Part number	**BN 57 49 19**	**BN 57 49 25**
Frequency range	170 - 240 MHz	
Block spacing	≥ 0	
Narrow band input	1 5/8" EIA	
Filter type integrated cavities/size	**8/150 ≡ BN 61 71 83**	
Temperature stability	≤ 1 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz	
DAB and T-DMB Mask filtering	DAB / T-DMB @ 1.54 MHz ($\hat{U}/U_{rms}$=13 dB)	
Average input power	**≤ 3.2 kW**	
Tuning instruction	AS8027	
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 1.3 dB f_0 ± 0.77 MHz ≤ 2.2 dB f_0 ± 0.97 MHz ≥ 15 dB f_0 ± 1.75 MHz ≥ 45 dB f_0 ± 2.2 MHz ≥ 65 dB f_0 ± 3.0 MHz ≥ 80 dB	
Group delay variation	Δτ ≤ 1000 ns	
Wide band input	1 5/8" EIA	3 1/8" EIA male
Average input power	≤ 14 kW	≤ 30 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input	
Mask filtering	no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output Peak output voltage	1 5/8" EIA ≤ 7.7 kV	3 1/8" EIA male ≤ 12.7 kV
Isolation between inputs	≥ 35 dB	
VSWR	≤ 1.1	
Dimensions (L x W x H) mm	1000 x 390 x 1420	
Weight	≈ 150 kg	≈ 170 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

BAND 3 DAB CIB COMBINERS

- **CCS** compact design
- for 1.54 MHz block width
- integrated mask filters for DAB and T-DMB
- adjacent block operation
- temperature compensated
- filters without cross coupling (notch function)

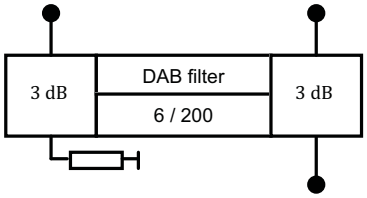


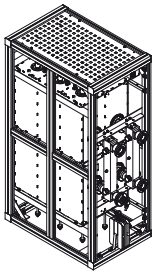


Part number	**BN 57 49 90**
Frequency range	170 - 240 MHz
Block spacing	≥ 0
Narrow band input	1 5/8" EIA
Filter type integrated cavities/size	**6/200 ≡ BN 61 71 11**
Temperature stability	≤ 2 kHz / K
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz
DAB and T-DMB Mask filtering	DAB / T-DMB @ 1.54 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 6 kW**
Tuning instruction	AS6029
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.75 dB f_0 ± 0.77 MHz ≤ 1.20 dB f_0 ± 0.97 MHz ≥ 8 dB f_0 ± 1.15 MHz ≥ 16 dB f_0 ± 1.75 MHz ≥ 43 dB f_0 ± 2.2 MHz ≥ 53 dB f_0 ± 3.0 MHz ≥ 73 dB
Group delay variation	Δτ ≤ 800 ns
Wide band input	3 1/8" EIA male
Average input power	≤ 30 kW Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input
Mask filtering	no
Insertion loss	≤ 0.1 dB (non adjacent)
Output Peak output voltage	3 1/8" EIA male ≤ 12.7 kV
Isolation between inputs	≥ 35 dB
VSWR	≤ 1.1
Dimensions (L x W x H) mm	925 x 520 x 1420
Weight	≈ 200 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“

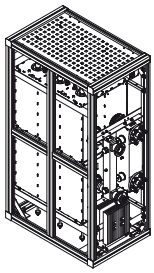
BAND 3 DAB CIB COMBINERS

- **CCS** compact design
- for 1.54 MHz block width
- integrated mask filters for DAB and T-DMB
- adjacent block operation
- temperature compensated
- filters with cross coupling (notch function)
- liquid cooled filter





BN 57 49 92



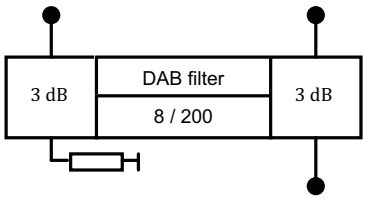
BN 57 46 90

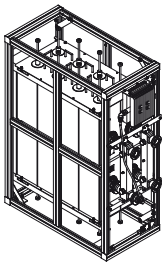
Part number	**BN 57 49 92 natural cooling**	**BN 57 46 91 liquid cooling**	**BN 57 46 90 natural cooling**
Frequency range	170 - 240 MHz		
Block spacing	≥ 0		
Narrow band input	1 5/8" EIA		
Filter type integrated cavities/size	**6/200 ≡ BN 617108**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz		
DAB and T-DMB Mask filtering	DAB / T-DMB @ 1.54 MHz ($\hat{U}/U_{rms}$=13 dB)		
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 6 kW**	**≤ 10.2 kW** @ 0 - 500 m **≤ 9.0 kW** @ 1400 m **≤ 8.0 kW** @ 2100 m **≤ 7.0 kW** @ 2800 m **≤ 6.0 kW** @ 3600 m	**≤ 6 kW**
Tuning instruction	AS6019		AS6087
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.65 dB f_0 ± 0.77 MHz ≤ 1.30 dB f_0 ± 0.97 MHz ≥ 12 dB f_0 ± 1.15 MHz ≥ 30 dB f_0 ± 1.75 MHz ≥ 40 dB f_0 ± 2.20 MHz ≥ 55 dB f_0 ± 3.00 MHz ≥ 55 dB		f_0 ≤ 0.6 dB f_0 ± 0.77 MHz ≤ 1.4 dB f_0 ± 0.97 MHz ≥ 15 dB f_0 ± 1.15 MHz n.d. f_0 ± 1.75 MHz ≥ 45 dB f_0 ± 2.20 MHz ≥ 50 dB f_0 ± 3.00 MHz ≥ 50 dB
Group delay variation	Δτ ≤ 1000 ns		Δτ ≤ 1200 ns
Wide band input	1 5/8" EIA		3 1/8" EIA male
Average input power	≤ 14 kW		≤ 30 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output Peak output voltage	1 5/8" EIA ≤ 7.7 kV		3 1/8" EIA male ≤ 12.7 kV
Isolation between inputs	≥ 35 dB		
VSWR	≤ 1.1		
Dimensions (L x W x H) mm	≈ 925 x 520 x 1420		
Weight	≈ 200 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

Data subject to change without notice – Edition E

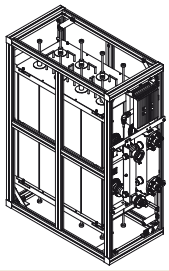
BAND 3 DAB CIB COMBINERS

- **CCS** compact design
- for 1.54 MHz block width
- integrated mask filters for DAB and T-DMB
- adjacent block operation
- temperature compensated
- filters with cross coupling (notch function)
- liquid cooled filter





BN 57 49 07

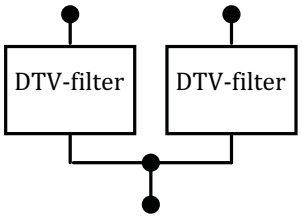


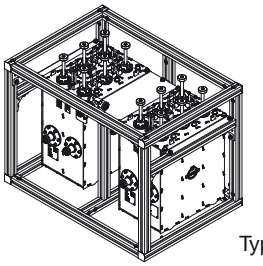
BN 57 46 48

Part number	**BN 57 49 07 natural cooling**	**BN 57 46 97 liquid cooling**	**BN 57 46 48 natural cooling**
Frequency range	170 - 240 MHz		
Block spacing	≥ 0		
Narrow band input	1 5/8" EIA		
Filter type integrated cavities/size	**8/200 ≡ BN 617113**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz		
DAB and T-DMB Mask filtering	DAB / T-DMB @ 1.54 MHz ($\hat{U}/U_{rms}$=13 dB)		
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 6 kW**	**≤ 10.2 kW** @ 0 - 500 m **≤ 9.0 kW** @ 1400 m **≤ 8.0 kW** @ 2100 m **≤ 7.0 kW** @ 2800 m **≤ 6.0 kW** @ 3600 m	**≤ 6 kW**
Tuning instruction	AS8042		AS8075
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.7 dB f_0 ± 0.77 MHz ≤ 1.3 dB f_0 ± 0.97 MHz ≥ 15 dB f_0 ± 1.15 MHz ≥ 30 dB f_0 ± 1.75 MHz ≥ 50 dB f_0 ± 2.20 MHz ≥ 65 dB f_0 ± 3.00 MHz ≥ 65 dB		f_0 ≤ 0.75 dB f_0 ± 0.77 MHz ≤ 1.55 dB f_0 ± 0.97 MHz ≥ 28 dB f_0 ± 1.15 MHz n.d. f_0 ± 1.75 MHz ≥ 61 dB f_0 ± 2.20 MHz ≥ 67 dB f_0 ± 3.00 MHz ≥ 70 dB
Group delay variation	Δτ ≤ 1200 ns		Δτ ≤ 1300 ns
Wide band input	1 5/8" EIA		3 1/8" EIA male
Average input power	≤ 14 kW		≤ 30 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output Peak output voltage	1 5/8" EIA ≤ 7.7 kV		3 1/8" EIA male ≤ 12.7 kV
Isolation between inputs	≥ 35 dB		
VSWR	≤ 1.1		
Dimensions (L x W x H) mm	≈ 1200 x 520 x 1420		
Weight	≈ 240 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

BAND 3 DTV STARPOINT COMBINERS

- compact design as 19" slide-in unit
- for 6, 7 and 8 MHz channel bandwidth
- integrated mask filters for DTV
- temperature compensated
- filters with cross coupling (notch function)
- tuneable within the whole band 3



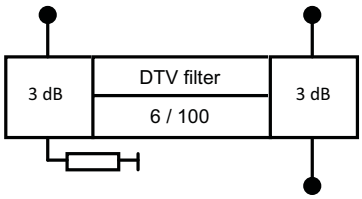


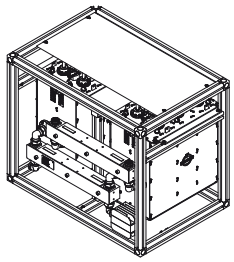
Typical design

Part number	**BN 57 46 69**		
Frequency range	174 - 230 MHz		
Block spacing	≥ 1		
Narrow band inputs	7-16 female		
Filter type integrated cavities/size	**6/100 ≡ BN 61 71 90**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz		
Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	DVB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 1.1 kW**	**≤ 1.0 kW**	**≤ 900 W**
Tuning instruction	AS6164	AS6162	AS6161
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.35 dB $f_0 \pm 3.805$ ≤ 0.75 dB $f_0 \pm 4.200$ ≥ 4.0 dB $f_0 \pm 6.000$ ≥ 20 dB $f_0 \pm 12.00$ ≥ 55 dB	f_0 ≤ 0.35 dB $f_0 \pm 3.35$ ≤ 0.80 dB $f_0 \pm 3.50$ ≥ 1.2 dB $f_0 \pm 3.65$ ≥ 4.0 dB $f_0 \pm 5.00$ ≥ 20 dB $f_0 \pm 12.0$ ≥ 55 dB	f_0 ≤ 0.40 dB $f_0 \pm 2.69$ ≤ 0.60 dB $f_0 \pm 3.00$ ≥ 1.2 dB $f_0 \pm 3.50$ ≥ 8.0 dB $f_0 \pm 4.00$ ≥ 15 dB $f_0 \pm 6.00$ ≥ 30 dB $f_0 \pm 9.00$ ≥ 64 dB
Group delay variation	$\Delta\tau \leq 350$ ns	$\Delta\tau \leq 350$ ns	$\Delta\tau \leq 220$ ns
Output	7-16 female		
Isolation between inputs	≥ 35 dB		
VSWR	≤ 1.2		
Dimensions (L x W x H) mm	689 x 448 x 510		
Weight	≈ 55 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

BAND 3 DTV CIB COMBINERS

- compact design
- for 6, 7 and 8 MHz channel bandwidth
- integrated mask filters for DTV
- adjacent channel operation
- temperature compensated
- filters with cross coupling (notch function)
- tuneable within the whole band 3

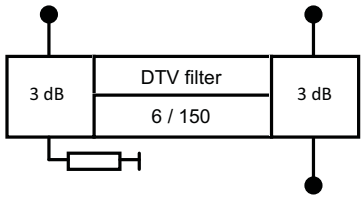


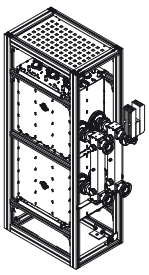


Part number	**BN 57 46 68**		
Frequency range	174 - 230 MHz		
Block spacing	≥ 0		
Narrow band input	7-16 female		
Filter type integrated cavities/size	**6/100 ≡ BN 61 71 90**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz		
Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	DVB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 2.2 kW**	**≤ 2.0 kW**	**≤ 1.8 kW**
Tuning instruction	AS6164	AS6162	AS6161
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.35 dB $f_0 \pm 3.805$ ≤ 0.75 dB $f_0 \pm 4.200$ ≥ 4.0 dB $f_0 \pm 6.000$ ≥ 20 dB $f_0 \pm 12.00$ ≥ 55 dB	f_0 ≤ 0.35 dB $f_0 \pm 3.35$ ≤ 0.80 dB $f_0 \pm 3.50$ ≥ 1.3 dB $f_0 \pm 3.65$ ≥ 4.0 dB $f_0 \pm 5.00$ ≥ 20 dB $f_0 \pm 12.0$ ≥ 55 dB	f_0 ≤ 0.40 dB $f_0 \pm 2.69$ ≤ 0.60 dB $f_0 \pm 3.00$ ≥ 1.2 dB $f_0 \pm 3.50$ ≥ 8.0 dB $f_0 \pm 4.00$ ≥ 15 dB $f_0 \pm 6.00$ ≥ 30 dB $f_0 \pm 9.00$ ≥ 64 dB
Group delay variation	$\Delta\tau \leq 350$ ns	$\Delta\tau \leq 350$ ns	$\Delta\tau \leq 220$ ns
Wide band input	7-16 female		
Average input power	≤ 3 kW Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output Peak output voltage	7-16 female ≤ 3.2 kV		
Isolation between inputs	≥ 35 dB		
VSWR	≤ 1.1		
Dimensions (L x W x H) mm	≈ 690 x 460 x 560		
Weight	≈ 64 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

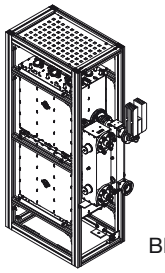
BAND 3 DTV CIB COMBINERS

- compact design
- for 6, 7 and 8 MHz channel bandwidth
- integrated mask filters for DTV
- adjacent channel operation
- temperature compensated
- filters with cross coupling (notch function)
- tuneable within the whole band 3





BN 57 49 36

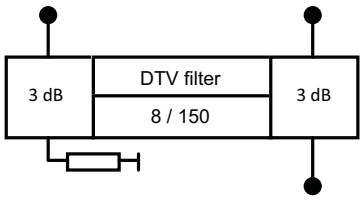


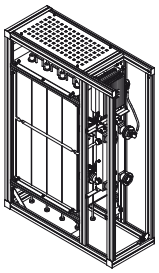
BN 57 49 38

Part number	**BN 57 49 36**	**BN 57 49 38**
Frequency range	174 - 230 MHz	
Block spacing	≥ 0	
Narrow band input	1 5/8" EIA	
Filter type integrated cavities/size	**6/150 ≡ BN 617126**	
Temperature stability	≤ 2 kHz / K	
Mask filtering	DVB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 8 kW**	**≤ 7.2 kW**
Tuning instruction	AS6044	AS6079
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.40 dB f_0 ± 3.35 MHz ≤ 0.70 dB f_0 ± 3.50 MHz ≥ 0.80 dB f_0 ± 3.65 MHz ≥ 2.0 dB f_0 ± 5.00 MHz ≥ 35 dB f_0 ± 12.0 MHz ≥ 55 dB	f_0 ≤ 0.45 dB f_0 ± 2.69 MHz ≤ 0.70 dB f_0 ± 3.00 MHz ≥ 1.4 dB f_0 ± 3.50 MHz ≥ 5.0 dB f_0 ± 4.00 MHz ≥ 11 dB f_0 ± 6.00 MHz ≥ 30 dB f_0 ± 9.00 MHz ≥ 65 dB
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 200 ns
Wide band input	1 5/8" EIA	3 1/8" EIA male
Average input power	≤ 14 kW	≤ 30 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input	
DTV Mask filtering	no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output Peak output voltage	1 5/8" EIA ≤ 7.7 kV	3 1/8" EIA male ≤ 12.7 kV
Isolation between inputs	≥ 35 dB	
VSWR	≤ 1.1	
Dimensions (L x W x H) mm	≈ 852 x 390 x 1420	≈ 852 x 390 x 1420
Weight	≈ 120 kg	≈ 130 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

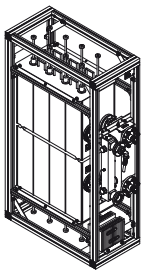
BAND 3 DTV CIB COMBINERS

- compact design
- for 6, 7 and 8 MHz channel bandwidth
- integrated mask filters for DTV
- adjacent channel operation
- temperature compensated
- filters with cross coupling (notch function)
- tuneable within the whole band 3





BN 57 46 86

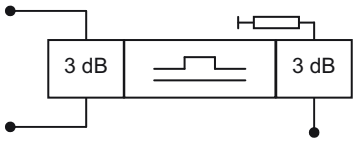


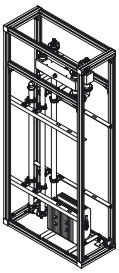
BN 57 46 87

Part number	**BN 57 46 86**	**BN 57 46 87**
Frequency range	174 - 230 MHz	
Block spacing	≥ 0	
Narrow band input	1 5/8" EIA	
Filter type integrated cavities/size	**8/150 ≡ BN 617191**	
Temperature stability	≤ 2 kHz / K	
Mask filtering	DVB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)	
Average input power	**≤ 7 kW**	
Tuning instruction	AS8049	
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.45 dB f_0 ± 3.35 MHz ≤ 0.95 dB f_0 ± 3.70 MHz ≥ 15 dB f_0 ± 5.25 MHz ≥ 30 dB f_0 ± 10.50 MHz ≥ 50 dB f_0 ± 11.75 MHz ≥ 55 dB	
Group delay variation	Δτ ≤ 600 ns	
Wide band input	1 5/8" EIA	3 1/8" EIA male
Average input power	≤ 14 kW	≤ 30 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input	
DTV Mask filtering	no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output Peak output voltage	1 5/8" EIA ≤ 7.7 kV	3 1/8" EIA male ≤ 12.7 kV
Isolation between inputs	≥ 35 dB	
VSWR	≤ 1.1	
Dimensions (L x W x H) mm	≈ 1000 x 390 x 1420	
Weight	≈ 155 kg	≈ 160 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

CCS UHF STRETCH LINE COMBINERS

- **CCS** compact design
- suitable for analogue and digital TV
- for 6, 7 and 8 MHz channel bandwidth





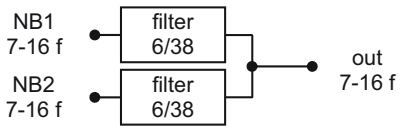
Typical design

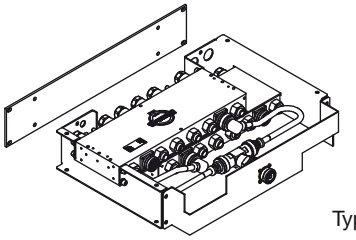
Part number	**BN 57 49 31**	**BN 57 46 34**	**BN 57 46 35**	**BN 57 46 36**	**BN 57 46 37**
Frequency range	470 - 860 MHz				
Channel spacing	≥ 3				
Narrow band inputs	7-16 female	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male	4 1/2" EIA
Average input power	**≤ 0.8 kW**	**≤ 7 kW**	**≤ 17.5 kW**	**≤ 23 kW**	**≤ 37 kW**
DTV Mask filtering	no				
Insertion loss Channel spacing ≥ 3	typ. ≤ 0.7dB	typ. ≤ 0.5 dB			
Insertion loss Channel spacing ≥ 5	typ. ≤ 0.3 dB	typ. ≤ 0.1 dB			
Output Peak output voltage	7-16 female ≤ 2 kV	3 1/8" EIA male ≤ 12.5 kV	4 1/2" EIA ≤ 18 kV	6 1/8" EIA ≤ 22 kV	6 1/8" EIA ≤ 34 kV
Isolation between inputs	≥ 34 dB				
VSWR	≤ 1.06				
Dimensions (L x W x H) mm	600 x 483 x 90	900 x 390 x 1980		900 x 480 x 1980	
Weight	≈ 12 kg	≈ 62 kg	≈ 115 kg	≈ 170 kg	≈ 200 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“				

Data subject to change without notice – Edition E

UHF STARPOINT COMBINERS

- compact design as 19" slide-in unit
- integrated mask filters for DTV
- applicable within the whole UHF range
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- wall mount available





Typical design

Part number **Front plate design**	**BN 57 46 55 C0002** **ports at rear side**		
Frequency range	470 - 860 MHz		
Channel spacing	≥ 1		
Narrow band inputs	7-16 female		
Filter type integrated cavities/size	**6/38 ≡ BN 616501**		
Temperature stability	≤ 3 kHz / K		
Harmonics attenuation	≥ 60 dB for f ≤ 1340 MHz		
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 100 W**	**≤ 100 W**	**≤ 100 W**
Tuning instruction	AS6214	AS6180	AS6074
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.8 dB ≤ 1.0 dB f_0 ± 3.805 ≤ 1.8 dB ≤ 2.3 dB f_0 ± 3.885 ≤ 2.1 dB ≤ 2.6 dB f_0 ± 4.2 ≥ 5 dB f_0 ± 6.0 ≥ 17 dB f_0 ± 12.0 ≥ 38 dB	470 MHz 803 MHz f_0 ≤ 0.9 dB ≤ 1.4 dB f_0 ± 2.79 ≤ 1.8 dB ≤ 3.5 dB f_0 ± 3.00 ≥ 2 dB f_0 ± 3.15 ≥ 5 dB f_0 ± 4.5 ≥ 17 dB f_0 ± 9.0 ≥ 38 dB f_0 ± 15.0 ≥ 48 dB	470 MHz 803 MHz f_0 ≤ 1.0 dB ≤ 1.2 dB f_0 ± 2.69 ≤ 1.7 dB ≤ 2.0 dB f_0 ± 3.0 ≤ 2.9 dB ≤ 3.1 dB f_0 ± 3.5 ≥ 10 dB f_0 ± 4.0 ≥ 15 dB f_0 ± 6.0 ≥ 26 dB f_0 ± 9.0 ≥ 38 dB
Group delay variation	Δτ ≤ 300 ns	Δτ ≤ 500 ns	Δτ ≤ 200 ns
Output	7-16 female		
Isolation between inputs	≥ 35 dB		
VSWR	≤ 1.2		
Dimensions (L x W x H) mm	400 x 483 x 90 (2RU)		
Weight	≈ 9 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

CCS UHF STARPOINT COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
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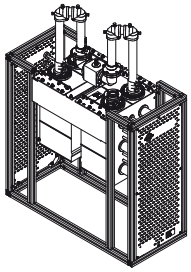
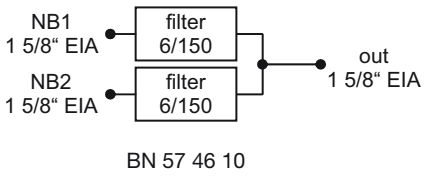
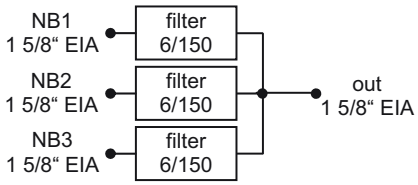
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated



Typical design



BN 57 46 10



BN 57 46 11

Part number **Number of inputs**	**BN 57 46 10** **2-way**	**BN 57 46 11** **3-way**
Frequency range	470 - 860 MHz	
Channel spacing	≥ 1	
Narrow band inputs	1 5/8“ EIA	
Filter type integrated cavities/size	**6/150 ≡ BN 616518**	
Temperature stability	≤ 2 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz	
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB) / DVB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 2.5 kW**	**≤ 2.0 kW** / **≤ 2.25 kW**
Tuning instruction	AS6193	AS6184 / AS6289
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.4 dB ≤ 0.55 dB $f_0 \pm 3.805$ ≤ 0.85 dB ≤ 1.3 dB $f_0 \pm 3.885$ ≤ 1.05 dB ≤ 1.5 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6.0$ ≥ 20 dB $f_0 \pm 12.0$ ≥ 40 dB	470 MHz 803 MHz f_0 ≤ 0.5 dB ≤ 0.7 dB $f_0 \pm 2.79$ ≤ 1.2 dB ≤ 1.6 dB $f_0 \pm 3.00$ ≥ 3.5 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9.0$ ≥ 48 dB $f_0 \pm 15.0$ ≥ 50 dB 470 MHz 820 MHz f_0 ≤ 0.45 dB ≤ 0.60 dB $f_0 \pm 3.2$ ≤ 0.65 dB ≤ 0.95 dB $f_0 \pm 4.2$ ≥ 13 dB $f_0 \pm 10.5$ ≥ 38 dB
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 500 ns / Δτ ≤ 150 ns
Output	1 5/8" EIA male	
Isolation between inputs	≥ 35 dB	
VSWR	≤ 1.2	
Dimensions (L x W x H) mm	900 x 390 x 1200	900 x 780 x 1200
Weight	≈ 80 kg	≈ 130 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

CCS UHF STARPOINT COMBINERS

- **CCS** compact design
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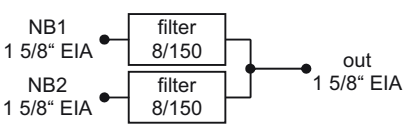
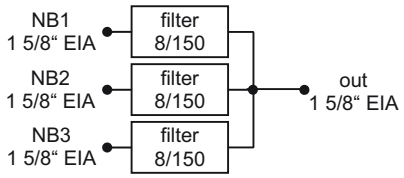
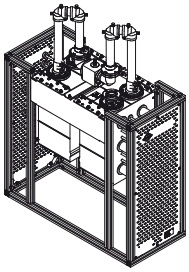
- applicable within the whole UHF range
- integrated mask filters for DTV
- temperature compensated



BN 57 46 12



BN 57 46 13

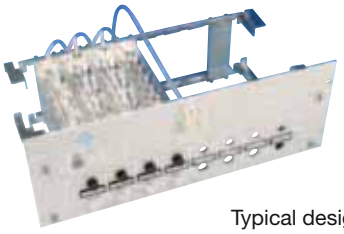


Typical design

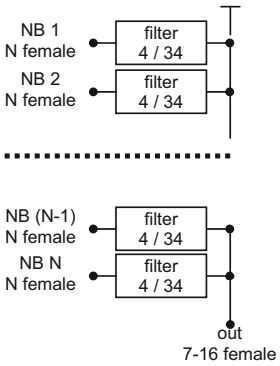
Part number **Number of inputs**	**BN 57 46 12** **2-way**		**BN 57 46 13** **3-way**			
Frequency range	470 - 860 MHz					
Channel spacing	≥ 1					
Narrow band inputs	1 5/8“ EIA					
Filter type integrated cavities/size	**8/150 ≡ BN 616542**					
Temperature stability	≤ 2 kHz / K					
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz					
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)		ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)		DVB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)	
Average input power	**≤ 2.0 kW**		**≤ 1.6 kW**		**≤ 1.6 kW**	
Tuning instruction	AS8071		AS8096		AS8094	
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz	860 MHz	470 MHz	803 MHz	470 MHz	803 MHz
	f_0	≤ 0.5 dB	≤ 0.75 dB	f_0	≤ 0.6 dB	≤ 0.80 dB	f_0	≤ 0.8 dB	≤ 1.0 dB
	f_0 ± 3.805	≤ 1.6 dB	≤ 2.2 dB	f_0 ± 2.79	≤ 1.4 dB	≤ 1.85 dB	f_0 ± 2.69	≤ 1.6 dB	≤ 1.7 dB
	f_0 ± 3.885	≤ 1.8 dB	≤ 2.5 dB	f_0 ± 3.15	≥ 15 dB		f_0 ± 3.00	≤ 4.0 dB	
	f_0 ± 4.2	≥ 15 dB		f_0 ± 4.5	≥ 30 dB		f_0 ± 3.25	≥ 18 dB	
	f_0 ± 6.0	≥ 40 dB		f_0 ± 9.0	≥ 55 dB		f_0 ± 9.00	≥ 64 dB	
	f_0 ± 12.0	≥ 55 dB							
Group delay variation	Δτ ≤ 700 ns		Δτ ≤ 500 ns		Δτ ≤ 400 ns	
Output	1 5/8" EIA male					
Isolation between inputs	≥ 35 dB					
VSWR	≤ 1.2					
Dimensions (L x W x H) mm	900 x 390 x 1200		900 x 780 x 1200			
Weight	≈ 120 kg		≈ 175 kg			
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“					

UHF LOW POWER MANIFOLD COMBINERS

- 4 RU compact design as 19" slide-in unit
- suitable for analogue and digital TV
- applicable within the whole UHF range
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated



Typical design



Part number	BN 57 45 82	BN 57 45 83	BN 57 45 84	BN 57 45 89
Frequency range	470 - 860 MHz			
Channel spacing	≥ 2 (1 channel available on request)			
Narrow band inputs	N female			
Filter type integrated cavities/size	**4/34 ≡ BN 616507**			
Temperature stability	≤ 10 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 1500 MHz			
DTV Mask filtering	no			
Average input power / channel width	**50 W** per input / 8 MHz **45 W** per input / 7 MHz **40 W** per input / 6 MHz			
Number of inputs	2	3	4	5
Insertion loss (varying with sequence) AS4054 for 8 MHz ($\hat{U}/U_{rms}$=13 dB)	f_0 0.7 - 0.85 dB $f_0 \pm 3.885$ 0.8 - 0.95 dB $f_0 \pm 12.0$ ≥ 17 dB	f_0 0.7 - 0.9 dB $f_0 \pm 3.885$ 0.8 - 1.0 dB $f_0 \pm 12.0$ ≥ 17 dB	f_0 0.7 - 1.0 dB $f_0 \pm 3.885$ 0.8 - 1.1 dB $f_0 \pm 12.0$ ≥ 17 dB	f_0 0.7 - 1.1 dB $f_0 \pm 3.885$ 0.8 - 1.2 dB $f_0 \pm 12.0$ ≥ 17 dB
Group delay variation	Δτ ≤ 100 ns			
Insertion loss (varying with sequence) AS4046 for 7 MHz ($\hat{U}/U_{rms}$=13 dB)	f_0 0.75 - 0.9 dB $f_0 \pm 3.325$ 0.85 - 1.0 dB $f_0 \pm 10.5$ ≥ 20 dB	f_0 0.75 - 0.95 dB $f_0 \pm 3.325$ 0.85 - 1.05 dB $f_0 \pm 10.5$ ≥ 20 dB	f_0 0.75 - 1.05 dB $f_0 \pm 3.325$ 0.85 - 1.15 dB $f_0 \pm 10.5$ ≥ 20 dB	f_0 0.75 - 1.15 dB $f_0 \pm 3.325$ 0.85 - 1.25 dB $f_0 \pm 10.5$ ≥ 20 dB
Group delay variation	Δτ ≤ 65 ns			
Insertion loss (varying with sequence) AS4029 for 6 MHz ($\hat{U}/U_{rms}$=11 dB)	f_0 0.8 - 0.95 dB $f_0 \pm 2.885$ 0.9 - 1.05 dB $f_0 \pm 9.0$ ≥ 25 dB	f_0 0.8 - 1.0 dB $f_0 \pm 2.885$ 0.9 - 1.1 dB $f_0 \pm 9.0$ ≥ 25 dB	f_0 0.8 - 1.1 dB $f_0 \pm 2.885$ 0.9 - 1.2 dB $f_0 \pm 9.0$ ≥ 25 dB	f_0 0.8 - 1.2 dB $f_0 \pm 2.885$ 0.9 - 1.3 dB $f_0 \pm 9.0$ ≥ 25 dB
Group delay variation	Δτ ≤ 30 ns			
Output Peak output voltage	7-16 female ≤ 2 kV			
Isolation between inputs	≥ 25 dB			
VSWR (one WB channel)	≤ 1.2			
Dimensions (L x W x H) mm	340 x 483 x 177 (4RU)			
Weight	≈ 5 kg	≈ 8 kg	≈ 9 kg	≈ 10 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

UHF LOW POWER MANIFOLD COMBINERS

- 4 RU compact design as 19" slide-in unit
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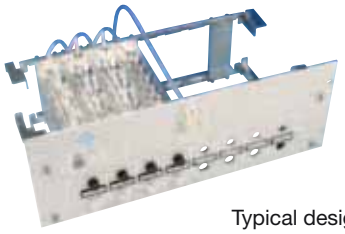
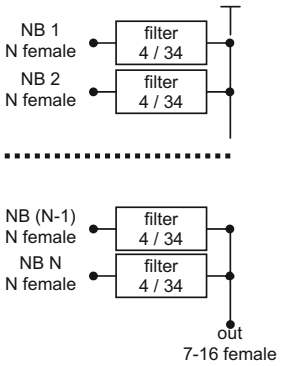
- applicable within the whole UHF range
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated



Typical design



Part number	BN 57 45 86	BN 57 45 87	BN 57 45 88	BN 57 45 89
Frequency range	470 - 860 MHz			
Channel spacing	≥ 2 (1 channel available on request)			
Narrow band inputs	N female			
Filter type integrated cavities/size	**4/34 ≡ BN 616507**			
Temperature stability	≤ 10 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 1500 MHz			
DTV Mask filtering	no			
Average input power / channel width	**50 W** per input / 8 MHz **45 W** per input / 7 MHz **40 W** per input / 6 MHz			
Number of inputs	6	7	8	9
Insertion loss (varying with sequence) AS4054 for 8 MHz ($\hat{U}/U_{rms}$=13 dB)	f_0 0.7 - 1.15 dB $f_0 \pm 3.885$ 0.8 - 1.25 dB $f_0 \pm 12.0$ ≥ 17 dB	f_0 0.7 - 1.2 dB $f_0 \pm 3.885$ 0.8 - 1.3 dB $f_0 \pm 12.0$ ≥ 17 dB	f_0 0.7 - 1.3 dB $f_0 \pm 3.885$ 0.8 - 1.4 dB $f_0 \pm 12.0$ ≥ 17 dB	f_0 0.7 - 1.4 dB $f_0 \pm 3.885$ 0.8 - 1.5 dB $f_0 \pm 12.0$ ≥ 17 dB
Group delay variation	Δτ ≤ 100 ns			
Insertion loss (varying with sequence) AS4046 for 7 MHz ($\hat{U}/U_{rms}$=13 dB)	f_0 0.75 - 1.2 dB $f_0 \pm 3.325$ 0.85 - 1.3 dB $f_0 \pm 10.5$ ≥ 20 dB	f_0 0.75 - 1.25 dB $f_0 \pm 3.325$ 0.85 - 1.35 dB $f_0 \pm 10.5$ ≥ 20 dB	f_0 0.75 - 1.35 dB $f_0 \pm 3.325$ 0.85 - 1.45 dB $f_0 \pm 10.5$ ≥ 20 dB	f_0 0.75 - 1.45 dB $f_0 \pm 3.325$ 0.85 - 1.45 dB $f_0 \pm 10.5$ ≥ 20 dB
Group delay variation	Δτ ≤ 65 ns			
Insertion loss (varying with sequence) AS4029 for 6 MHz ($\hat{U}/U_{rms}$=11 dB)	f_0 0.8 - 1.25 dB $f_0 \pm 2.885$ 0.9 - 1.35 dB $f_0 \pm 9.0$ ≥ 25 dB	f_0 0.8 - 1.3 dB $f_0 \pm 2.885$ 0.9 - 1.4 dB $f_0 \pm 9.0$ ≥ 25 dB	f_0 0.8 - 1.4 dB $f_0 \pm 2.885$ 0.9 - 1.5 dB $f_0 \pm 9.0$ ≥ 25 dB	f_0 0.8 - 1.5 dB $f_0 \pm 2.885$ 0.9 - 1.6 dB $f_0 \pm 9.0$ ≥ 25 dB
Group delay variation	Δτ ≤ 30 ns			
Output	7-16 female			
Average output power	≤ 450 W			
Peak output voltage	≤ 2 kV			
Isolation between inputs	≥ 25 dB			
VSWR (one WB channel)	≤ 1.2			
Dimensions (L x W x H) mm	340 x 483 x 177 (4RU)			
Weight	≈ 12 kg	≈ 13 kg	≈ 15 kg	≈ 18 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

UHF MANIFOLD COMBINERS

- compact design as 19" slide-in unit
- integrated mask filters for DTV
- applicable within the whole UHF range
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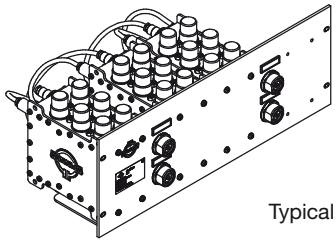
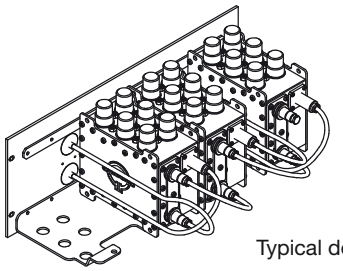
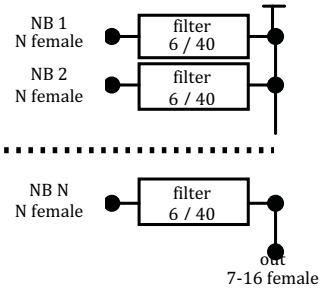
- temperature compensated



Typical design



Typical design

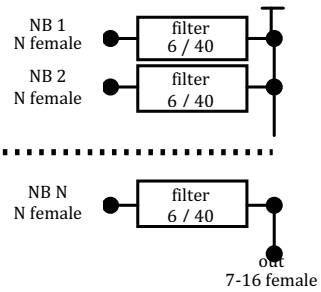


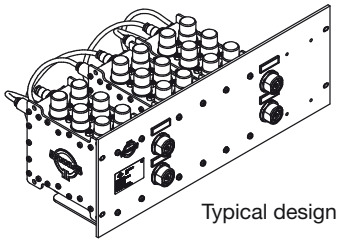
Part number	BN 57 55 62		BN 57 55 63		BN 57 55 64		BN 57 55 65	
Frequency range	470 - 860 MHz							
Channel spacing	≥ 1							
Narrow band inputs	N female							
Filter type integrated cavities/size	**6/40 ≡ BN 616660**							
Temperature stability	≤ 2 kHz / K							
Harmonics attenuation	≥ 50 dB for f ≤ 1400 MHz							
Average input power / channel width	**130 W per input / 8 MHz** **100 W per input / 6 MHz**							
Number of inputs	2		3		4		5	
DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB) AS6361 Insertion loss & Mask filtering	f_0 $f_0 \pm 3.805$ $f_0 \pm 3.885$ $f_0 \pm 4.2$ $f_0 \pm 6$ $f_0 \pm 12$	0.8 - 1.0 dB 2.0 - 2.5 dB 2.3 - 2.8 dB ≥ 4 dB ≥ 20 dB ≥ 40 dB	f_0 $f_0 \pm 3.805$ $f_0 \pm 3.885$ $f_0 \pm 4.2$ $f_0 \pm 6$ $f_0 \pm 12$	0.9 - 1.1 dB 2.0 - 2.6 dB 2.3 - 2.9 dB ≥ 4 dB ≥ 20 dB ≥ 40 dB	f_0 $f_0 \pm 3.805$ $f_0 \pm 3.885$ $f_0 \pm 4.2$ $f_0 \pm 6$ $f_0 \pm 12$	0.9 - 1.2 dB 2.0 - 2.7 dB 2.3 - 3.0 dB ≥ 4 dB ≥ 20 dB ≥ 40 dB	f_0 $f_0 \pm 3.805$ $f_0 \pm 3.885$ $f_0 \pm 4.2$ $f_0 \pm 6$ $f_0 \pm 12$	0.9 - 1.3 dB 2.0 - 2.8 dB 2.3 - 3.1 dB ≥ 4 dB ≥ 20 dB ≥ 40 dB
Group delay variation	$\Delta\tau \leq 350$ ns							
ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$ = 13 dB) AS6368 Insertion loss & Mask filtering	f_0 $f_0 \pm 2.79$ $f_0 \pm 3$ $f_0 \pm 3.15$ $f_0 \pm 4.5$ $f_0 \pm 9$ $f_0 \pm 15$	1.1 - 1.4 dB 2.7 - 3.3 dB ≥ 4 dB ≥ 8 dB ≥ 22 dB ≥ 50 dB ≥ 50 dB	f_0 $f_0 \pm 2.79$ $f_0 \pm 3$ $f_0 \pm 3.15$ $f_0 \pm 4.5$ $f_0 \pm 9$ $f_0 \pm 15$	1.1 - 1.5 dB 2.7 - 3.4 dB ≥ 4 dB ≥ 8 dB ≥ 22 dB ≥ 50 dB ≥ 50 dB	f_0 $f_0 \pm 2.79$ $f_0 \pm 3$ $f_0 \pm 3.15$ $f_0 \pm 4.5$ $f_0 \pm 9$ $f_0 \pm 15$	1.1 - 1.6 dB 2.7 - 3.5 dB ≥ 4 dB ≥ 8 dB ≥ 22 dB ≥ 50 dB ≥ 50 dB	f_0 $f_0 \pm 2.79$ $f_0 \pm 3$ $f_0 \pm 3.15$ $f_0 \pm 4.5$ $f_0 \pm 9$ $f_0 \pm 15$	1.1 - 1.7 dB 2.7 - 3.6 dB ≥ 4 dB ≥ 8 dB ≥ 22 dB ≥ 50 dB ≥ 50 dB
Group delay variation	$\Delta\tau \leq 350$ ns							
ATSC @ 6 MHz ($\hat{U}/U_{rms}$ = 11 dB) AS6362 Insertion loss & Mask filtering	f_0 $f_0 \pm 2.69$ $f_0 \pm 3.25$ $f_0 \pm 3.5$ $f_0 \pm 4$ $f_0 \pm 6$ $f_0 \pm 9$	1.3 - 1.8 dB 2.3 - 2.7 dB ≥ 4 dB ≥ 8 dB ≥ 15 dB ≥ 40 dB ≥ 65 dB	f_0 $f_0 \pm 2.69$ $f_0 \pm 3.25$ $f_0 \pm 3.5$ $f_0 \pm 4$ $f_0 \pm 6$ $f_0 \pm 9$	1.3 - 1.9 dB 2.3 - 2.8 dB ≥ 4 dB ≥ 8 dB ≥ 15 dB ≥ 40 dB ≥ 65 dB	f_0 $f_0 \pm 2.69$ $f_0 \pm 3.25$ $f_0 \pm 3.5$ $f_0 \pm 4$ $f_0 \pm 6$ $f_0 \pm 9$	1.3 - 2.0 dB 2.3 - 2.9 dB ≥ 4 dB ≥ 8 dB ≥ 15 dB ≥ 40 dB ≥ 65 dB	f_0 $f_0 \pm 2.69$ $f_0 \pm 3.25$ $f_0 \pm 3.5$ $f_0 \pm 4$ $f_0 \pm 6$ $f_0 \pm 9$	1.3 - 2.1 dB 2.3 - 3.0 dB ≥ 4 dB ≥ 8 dB ≥ 15 dB ≥ 40 dB ≥ 65 dB
Group delay variation	$\Delta\tau \leq 200$ ns							
Output Average output power Peak output voltage	7-16 female ≤ 600 W ≤ 2 kV							
Isolation between inputs	≥ 35 dB							
VSWR	≤ 1.2							
Dimensions (L x W x H) mm	300 x 483 x 177 (4RU)						300 x 483 x 355 (8RU)	
Weight	≈ 9 kg		≈ 13 kg		≈ 17 kg		≈ 21 kg	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“							

Data subject to change without notice – Edition E

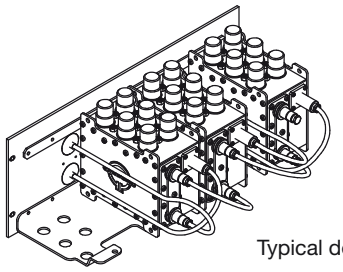
UHF MANIFOLD COMBINERS

- compact design as 19" slide-in unit
- integrated mask filters for DTV
- applicable within the whole UHF range
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated





Typical design

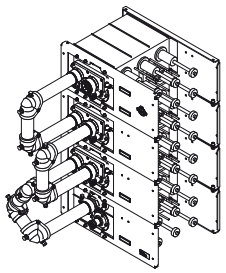


Typical design

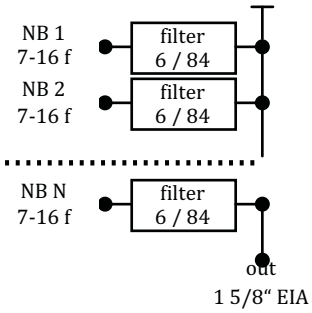
Part number	**BN 57 55 66**	**BN 57 55 67**	**BN 57 55 68**
Frequency range	470 - 860 MHz		
Channel spacing	≥ 1		
Narrow band inputs	N female		
Filter type integrated cavities/size	**6/40 ≡ BN 616660**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 1400 MHz		
Average input power / channel width	**130 W per input / 8 MHz** **100 W per input / 6 MHz**		
Number of inputs	6	7	8
DVB-T @ 8 MHz (Û/U_{rms} = 13 dB) AS6361 Insertion loss & Mask filtering	f_0 0.8 - 1.3 dB $f_0 \pm 3.805$ 2.0 - 2.8 dB $f_0 \pm 3.885$ 2.3 - 3.1 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	f_0 0.9 - 1.4 dB $f_0 \pm 3.805$ 2.0 - 2.9 dB $f_0 \pm 3.885$ 2.3 - 3.2 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	f_0 0.9 - 1.5 dB $f_0 \pm 3.805$ 2.0 - 3.0 dB $f_0 \pm 3.885$ 2.3 - 3.3 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB
Group delay variation	Δτ ≤ 350 ns		
ISDB-T @ 6 MHz (Û/U_{rms} = 13 dB) AS6368 Insertion loss & Mask filtering	f_0 1.1 - 1.7 dB $f_0 \pm 2.79$ 2.7 - 3.6 dB $f_0 \pm 3$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 22 dB $f_0 \pm 9$ ≥ 50 dB $f_0 \pm 15$ ≥ 50 dB	f_0 1.1 - 1.8 dB $f_0 \pm 2.79$ 2.7 - 3.7 dB $f_0 \pm 3$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 22 dB $f_0 \pm 9$ ≥ 50 dB $f_0 \pm 15$ ≥ 50 dB	f_0 1.1 - 1.9 dB $f_0 \pm 2.79$ 2.7 - 3.8 dB $f_0 \pm 3$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 22 dB $f_0 \pm 9$ ≥ 50 dB $f_0 \pm 15$ ≥ 50 dB
Group delay variation	Δτ ≤ 350 ns		
ATSC @ 6 MHz (Û/U_{rms} = 11 dB) AS6362 Insertion loss & Mask filtering	f_0 1.3 - 2.1 dB $f_0 \pm 2.69$ 2.3 - 3.0 dB $f_0 \pm 3.25$ ≥ 4 dB $f_0 \pm 3.5$ ≥ 8 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 9$ ≥ 65 dB	f_0 1.3 - 2.2 dB $f_0 \pm 2.69$ 2.3 - 3.1 dB $f_0 \pm 3.25$ ≥ 4 dB $f_0 \pm 3.5$ ≥ 8 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 9$ ≥ 65 dB	f_0 1.3 - 2.3 dB $f_0 \pm 2.69$ 2.3 - 3.2 dB $f_0 \pm 3.25$ ≥ 4 dB $f_0 \pm 3.5$ ≥ 8 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 9$ ≥ 65 dB
Group delay variation	Δτ ≤ 200 ns		
Output Average output power Peak output voltage	7-16 female ≤ 600 W ≤ 2 kV		
Isolation between inputs	≥ 35 dB		
VSWR	≤ 1.2		
Dimensions (L x W x H) mm	300 x 483 x 355 (8RU)		
Weight	≈ 25 kg	≈ 29 kg	≈ 32 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

UHF MANIFOLD COMBINERS

- compact design as 19" slide-in unit
- integrated mask filters for DTV
- applicable within the whole UHF range
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated



Typical design

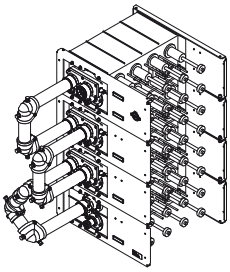


Part number	BN 57 49 12 C0003	BN 57 49 13 C0003	BN 57 49 14 C0003	BN 57 49 11 C0003
Frequency range	470 - 860 MHz			
Channel spacing	≥ 1			
Narrow band inputs	7-16 female			
Filter type integrated cavities/size	**6/84 ≡ BN 616402**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 950 MHz			
Average input power / channel width	**750 W** per input / 8 MHz **675 W** per input / 7 MHz **600 W** per input / 6 MHz			
Number of inputs	2	3	4	5
DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB) AS6186 Insertion loss & Mask filtering	f_0 ≤ 0.5 - 0.6 dB $f_0 \pm 3.805$ ≤ 1.2 - 1.5 dB $f_0 \pm 3.885$ ≤ 1.3 - 1.6 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	f_0 0.5 - 0.8 dB $f_0 \pm 3.805$ 1.3 - 1.6 dB $f_0 \pm 3.885$ 1.4 - 1.7 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	f_0 0.5 - 1.0 dB $f_0 \pm 3.805$ 1.3 - 1.9 dB $f_0 \pm 3.885$ 1.4 - 2.0 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	f_0 0.5 - 1.1 dB $f_0 \pm 3.805$ 1.3 - 2.0 dB $f_0 \pm 3.885$ 1.4 - 2.1 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB
Group delay variation	Δτ ≤ 300 ns			
ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$ = 13 dB) AS6182 Insertion loss & Mask filtering	f_0 0.6 - 0.8 dB $f_0 \pm 2.79$ 1.6 - 2.2 dB $f_0 \pm 3$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB	f_0 0.6 - 0.9 dB $f_0 \pm 2.79$ 1.7 - 2.3 dB $f_0 \pm 3$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB	f_0 0.6 - 1.1 dB $f_0 \pm 2.79$ 1.7 - 2.5 dB $f_0 \pm 3$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB	f_0 0.6 - 1.2 dB $f_0 \pm 2.79$ 1.7 - 2.6 dB $f_0 \pm 3$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB
Group delay variation	Δτ ≤ 500 ns			
ATSC @ 6 MHz ($\hat{U}/U_{rms}$ = 11 dB) AS6156 Insertion loss & Mask filtering	f_0 ≤ 0.7 - 0.9 dB $f_0 \pm 2.69$ ≤ 1.1 - 1.55 dB $f_0 \pm 3$ ≤ 1.9 - 2.45 dB $f_0 \pm 3.25$ ≥ 4 dB $f_0 \pm 3.5$ ≥ 8 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 9$ ≥ 65 dB	f_0 ≤ 0.7 - 1.0 dB $f_0 \pm 2.69$ ≤ 1.2 - 1.7 dB $f_0 \pm 3$ ≤ 1.9 - 2.6 dB $f_0 \pm 3.25$ ≥ 4 dB $f_0 \pm 3.5$ ≥ 8 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 9$ ≥ 65 dB	f_0 ≤ 0.7 - 1.2 dB $f_0 \pm 2.69$ ≤ 1.2 - 1.8 dB $f_0 \pm 3$ ≤ 1.9 - 2.7 dB $f_0 \pm 3.25$ ≥ 4 dB $f_0 \pm 3.5$ ≥ 8 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 9$ ≥ 65 dB	f_0 ≤ 0.7 - 1.3 dB $f_0 \pm 2.69$ ≤ 1.2 - 1.9 dB $f_0 \pm 3$ ≤ 1.9 - 2.8 dB $f_0 \pm 3.25$ ≥ 4 dB $f_0 \pm 3.5$ ≥ 8 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 9$ ≥ 65 dB
Group delay variation	Δτ ≤ 200 ns			
Output	1 5/8" EIA			
Isolation between inputs	≥ 35 dB			
VSWR	≤ 1.17			
Dimensions (L x W x H) mm	640 x 483 x 354 (8RU)	640 x 483 x 532 (12RU)	640 x 483 x 809 (16RU)	640 x 483 x 888 (20RU)
Weight	≈ 26 kg	≈ 38 kg	≈ 51 kg	≈ 64 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

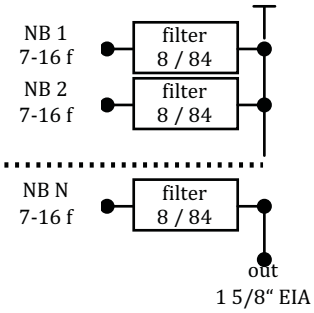
Data subject to change without notice – Edition E

UHF MANIFOLD COMBINERS

- compact design as 19" slide-in unit
- integrated mask filters for DTV
- applicable within the whole UHF range
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated



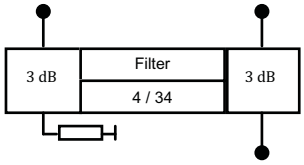
Typical design

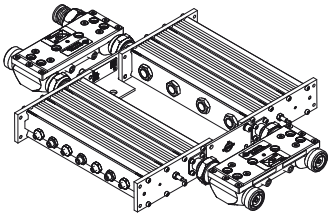


Part number	BN 57 49 22 C0003	BN 57 49 23 C0003	BN 57 49 24 C0003	BN 57 49 21 C0003
Frequency range	470 - 860 MHz			
Channel spacing	≥ 1			
Narrow band inputs	7-16 female			
Filter type integrated cavities/size	**8/84 ≡ BN 616403**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 950 MHz			
Average input power / channel width	**750 W** per input / 8 MHz **675 W** per input / 7 MHz **600 W** per input / 6 MHz			
Number of inputs	2	3	4	5
DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB) AS8068 Insertion loss & Mask filtering	f_0 ≤ 0.6 - 0.75 dB $f_0 \pm 3.805$ ≤ 1.8 - 2.2 dB $f_0 \pm 3.885$ ≤ 2.1 - 2.6 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	f_0 ≤ 0.6 - 0.9 dB $f_0 \pm 3.805$ ≤ 1.8 - 2.3 dB $f_0 \pm 3.885$ ≤ 2.1 - 2.7 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	f_0 ≤ 0.6 - 1.0 dB $f_0 \pm 3.805$ ≤ 1.8 - 2.4 dB $f_0 \pm 3.885$ ≤ 2.1 - 2.8 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	f_0 ≤ 0.6 - 1.1 dB $f_0 \pm 3.805$ ≤ 1.8 - 2.5 dB $f_0 \pm 3.885$ ≤ 2.1 - 2.9 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB
Group delay variation	Δτ ≤ 600 ns			
ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$ = 13 dB) AS8091 Insertion loss & Mask filtering	f_0 0.7 - 1.3 dB $f_0 \pm 2.79$ 1.8 - 3.1 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9$ ≥ 55 dB	f_0 0.7 - 1.4 dB $f_0 \pm 2.79$ 1.8 - 3.2 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9$ ≥ 55 dB	f_0 0.7 - 1.5 dB $f_0 \pm 2.79$ 1.8 - 3.3 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9$ ≥ 55 dB	f_0 0.7 - 1.6 dB $f_0 \pm 2.79$ 1.8 - 3.4 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9$ ≥ 55 dB
Group delay variation	Δτ ≤ 500 ns			
ATSC @ 6 MHz ($\hat{U}/U_{rms}$ = 11 dB) AS8051 Insertion loss & Mask filtering	f_0 ≤ 0.9 - 1.3 dB $f_0 \pm 2.69$ ≤ 1.9 - 2.7 dB $f_0 \pm 3$ ≥ 3 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB	f_0 ≤ 0.9 - 1.4 dB $f_0 \pm 2.69$ ≤ 1.9 - 2.8 dB $f_0 \pm 3$ ≥ 3 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB	f_0 ≤ 0.9 - 1.5 dB $f_0 \pm 2.69$ ≤ 1.9 - 2.9 dB $f_0 \pm 3$ ≥ 3 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB	f_0 ≤ 0.9 - 1.6 dB $f_0 \pm 2.69$ ≤ 1.9 - 3.0 dB $f_0 \pm 3$ ≥ 3 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB
Group delay variation	Δτ ≤ 400 ns			
Output	1 5/8" EIA			
Isolation between inputs	≥ 35 dB			
VSWR	≤ 1.17			
Dimensions (L x W x H) mm	720 x 483 x 354 (8RU)	720 x 483 x 532 (12RU)	720 x 483 x 809 (16RU)	720 x 483 x 888 (20RU)
Weight	≈ 34 kg	≈ 51 kg	≈ 68 kg	≈ 85 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

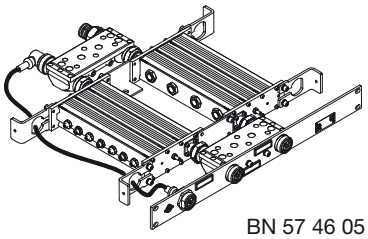
UHF CIB COMBINERS

- 1 RU compact design as 19” slide-in unit
- suitable for analogue and digital TV
- tuneable within the whole UHF range
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- wall mount available

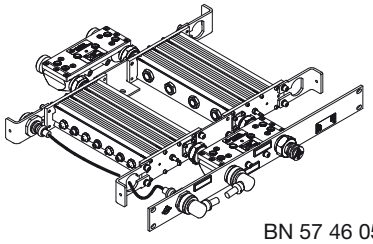




BN 57 46 05



BN 57 46 05 C0001



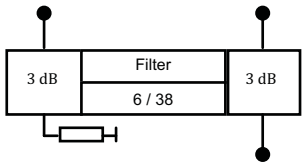
BN 57 46 05 C0002

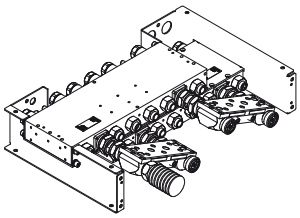
Part number Front plate design	**BN 57 46 05** without front plate	**BN 57 46 05 C0001** ports at front side	**BN 57 46 05 C0002** ports at rear side
Frequency range	470 - 860 MHz		
Channel spacing	≥ 1		
Narrow band input	7-16 female		
Filter type integrated cavities/size	**4/34 ≡ BN 616507**		
Temperature stability	≤ 10 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 1500 MHz		
DTV mask filtering	no		
Channel width	8 MHz ($\hat{U}/U_{rms}$=13 dB)	7 MHz ($\hat{U}/U_{rms}$=13 dB)	6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 100 W**	**≤ 90 W**	**≤ 80 W**
Tuning instruction	AS4054	AS4046	AS4029
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 860 MHz f_0 ≤ 0.8 dB / ≤ 0.7 dB $f_0 \pm 3.805$ ≤ 0.9 dB / ≤ 0.8 dB $f_0 \pm 3.885$ ≤ 0.9 dB / ≤ 0.8 dB $f_0 \pm 12$ ≥ 17 dB	470 MHz / 803 MHz f_0 ≤ 0.85 dB / ≤ 0.75 dB $f_0 \pm 3.2$ ≤ 0.95 dB / ≤ 0.85 dB $f_0 \pm 10.5$ ≥ 20 dB	470 MHz / 803 MHz f_0 ≤ 0.9dB / ≤ 0.8 dB $f_0 \pm 2.885$ ≤ 1.0 dB / ≤ 0.9 dB $f_0 \pm 9$ ≤ 25 dB
Group delay variation	Δτ ≤ 100 ns	Δτ ≤ 65 ns	Δτ ≤ 30 ns
Wide band input	7-16 female		
Average input power	600 W Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering Insertion loss	no ≤ 0.1 dB (non adjacent)		
Output	7-16 female		
Peak output voltage	1.6 kV		
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.1		
Dimensions (L x W x H) mm	471 x 483 x 45 (1RU)		
Weight	≈ 5.5 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

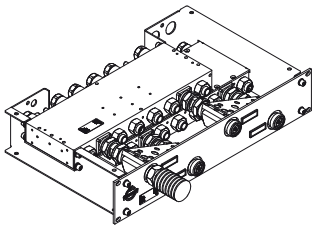
Data subject to change without notice – Edition E

UHF CIB COMBINERS

- 2-3 RU compact design as 19" slide-in unit
- adjacent channel operation
- integrated mask filters for DTV
- tuneable within the whole UHF range
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- wall mount available




BN 57 46 06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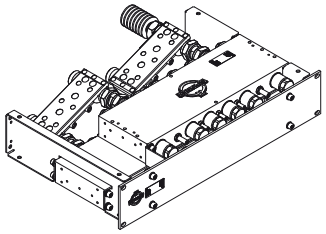
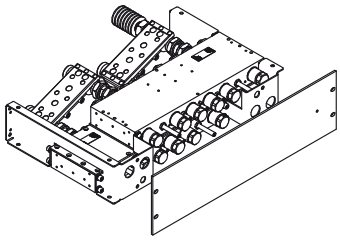
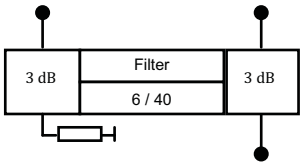

BN 57 46 06 C0002

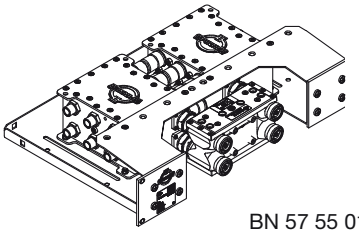

BN 57 49 06 C0002

Part number height / Front plate design	**BN 57 46 06** 2 RU without front plate **BN 57 49 06** 3 RU without front plate	**BN 57 46 06 C0001** 2 RU with ports at front side **BN 57 49 06 C0001** 3 RU with ports at front side	**BN 57 46 06 C0002** 2 RU ports at rear side **BN 57 49 06 C0002** 3 RU ports at rear side
Frequency range	470 - 860 MHz		
Channel spacing	≥ 0		
Narrow band input	7-16 female		
Filter type integrated cavities/size	**6/38 ≡ BN616501**		
Temperature stability	≤ 3 kHz / K		
Harmonics attenuation	≥ 60 dB for f ≤ 1340 MHz		
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 150 W** BN 574606 **≤ 200 W** BN 574906	**≤ 150 W** BN 574606 **≤ 200 W** BN 574906	**≤ 150 W** BN 574606 **≤ 200 W** BN 574906
Tuning instruction	AS6214	AS6180	AS6074
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 860 MHz f_0 ≤ 0.8 dB / ≤ 1.0 dB $f_0 \pm 3.805$ ≤ 1.8 dB / ≤ 2.3 dB $f_0 \pm 3.885$ ≤ 2.1 dB / ≤ 2.6 dB $f_0 \pm 4.2$ ≥ 5 dB $f_0 \pm 6$ ≥ 17 dB $f_0 \pm 12$ ≥ 38 dB	470 MHz / 803 MHz f_0 ≤ 0.9 dB / ≤ 1.4 dB $f_0 \pm 2.79$ ≤ 1.8 dB / ≤ 3.5 dB $f_0 \pm 3.0$ ≥ 2 dB $f_0 \pm 3.15$ ≥ 5 dB $f_0 \pm 4.5$ ≥ 17 dB $f_0 \pm 9$ ≥ 38 dB $f_0 \pm 15$ ≥ 48 dB	470 MHz / 803 MHz f_0 ≤ 1.0 dB / ≤ 1.2 dB $f_0 \pm 2.69$ ≤ 1.7 dB / ≤ 2.0 dB $f_0 \pm 3$ ≤ 2.9 dB / ≤ 3.1 dB $f_0 \pm 3.5$ ≥ 10 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 26 dB $f_0 \pm 9$ ≥ 38 dB
Group delay variation	Δτ ≤ 300 ns	Δτ ≤ 500 ns	Δτ ≤ 200 ns
Wide band input	7-16 female		
Average input power	1 kW Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output	7-16 female		
Peak output voltage	≤ 1.6 kV		
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.1		
Dimensions (L x W x H) mm	363 x 483 x 90 (2RU) BN 57 46 06 363 x 483 x 133 (3RU) BN 57 49 06		
Weight	≈ 10 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

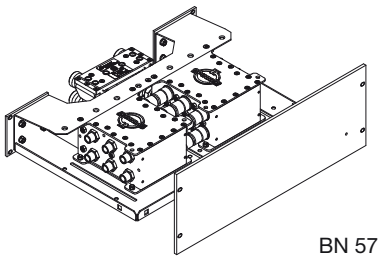
UHF CIB COMBINERS

- compact design as 19" slide-in unit
- for 6, 7 and 8 MHz channel bandwidth
- integrated mask filters for DTV
- adjacent channel operation
- temperature compensated
- tuneable within the whole UHF range





BN 57 55 01



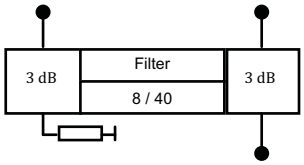
BN 57 55 01 C0002

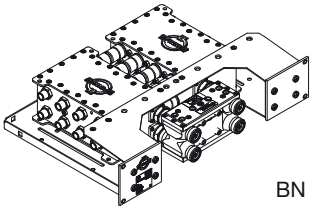
Part number Front plate design	**BN 57 55 01** **without front plate**			**BN 57 55 01 C0002** **with front plate and rear side ports**				
Frequency range	470 - 860 MHz							
Channel spacing	≥ 0							
Narrow band input	7-16 female							
Filter type integrated cavities/size	**6/40 ≡ BN616660**							
Temperature stability	≤ 2 kHz / K							
Harmonics attenuation	≥ 50 dB for f ≤ 1300 MHz							
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)			ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)			ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)	
Average input power	**≤ 260 W**			**≤ 200 W**			**≤ 200 W**	
Tuning instruction	AS6361			AS6368			AS6362	
Insertion loss & Mask filtering (alternative tuning on request)		470 MHz	860 MHz		470 MHz	803 MHz		470 MHz	803 MHz
	f_0	≤ 0.8 dB	≤ 1.0 dB	f_0	≤ 1.1 dB	≤ 1.4 dB	f_0	≤ 1.3 dB	≤ 1.8 dB
	$f_0 \pm 3.805$	≤ 2.0 dB	≤ 2.5 dB	$f_0 \pm 2.79$	≤ 2.7 dB	≤ 3.3 dB	$f_0 \pm 2.69$	≤ 2.3 dB	≤ 2.7 dB
	$f_0 \pm 3.885$	≤ 2.3 dB	≤ 2.8 dB	$f_0 \pm 3.0$	≥ 4 dB		$f_0 \pm 3.25$	≥ 4 dB	
	$f_0 \pm 4.2$	≥ 4 dB		$f_0 \pm 3.15$	≥ 8 dB		$f_0 \pm 3.5$	≥ 8 dB	
	$f_0 \pm 6$	≥ 20 dB		$f_0 \pm 4.5$	≥ 22 dB		$f_0 \pm 4$	≥ 15 dB	
	$f_0 \pm 12$	≥ 40 dB		$f_0 \pm 9$	≥ 50 dB		$f_0 \pm 6$	≥ 40 dB	
				$f_0 \pm 15$	≥ 50 dB		$f_0 \pm 9$	≥ 65 dB	
Group delay variation	Δτ ≤ 350 ns			Δτ ≤ 350 ns			Δτ ≤ 200 ns	
Wide band input	7-16 female							
Average input power	1 kW Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input							
DTV Mask filtering	no							
Insertion loss	≤ 0.1 dB (non adjacent)							
Output	7-16 female							
Peak output voltage	≤ 2.8 kV							
Isolation between inputs	≥ 35 dB							
VSWR (one WB channel)	≤ 1.06							
Dimensions (L x W x H) mm	355 x 483 x 133 (3RU)							
Weight	≈ 12 kg							
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“							

Data subject to change without notice – Edition E

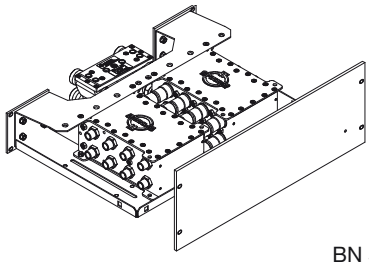
UHF CIB COMBINERS

- compact design as 19" slide-in unit
- for 6, 7 and 8 MHz channel bandwidth
- integrated mask filters for DTV
- adjacent channel operation
- temperature compensated
- tuneable within the whole UHF range





BN 57 55 06



BN 57 55 06 C0002

Part number Front plate design	**BN 57 55 06** **without front plate**		**BN 57 55 06 C0002** **with front plate and rear side ports**	
Frequency range	470 - 860 MHz			
Channel spacing	≥ 0			
Narrow band input	7-16 female			
Filter type integrated cavities/size	**8/40 ≡ BN616661**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 60 dB for f ≤ 1340 MHz			
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)		ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 240 W**		**≤ 200 W**	**≤ 200 W**
Tuning instruction	AS8131		AS8133	AS8132
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz	860 MHz	470 MHz / 803 MHz	470 MHz / 803 MHz
	f_0	≤ 1.2 dB	≤ 1.6 dB	f_0 ≤ 1.5 dB / ≤ 1.85 dB	f_0 ≤ 1.6 dB / ≤ 2.0 dB
	$f_0 \pm 3.805$	≤ 3.7 dB	≤ 5.3 dB	$f_0 \pm 2.79$ ≤ 4.5 dB / ≤ 5.1 dB	$f_0 \pm 2.69$ ≤ 3.9 dB / ≤ 4.5 dB
	$f_0 \pm 3.885$	≤ 4.5 dB	≤ 5.9 dB	$f_0 \pm 3.15$ ≥ 15 dB	$f_0 \pm 3$ ≥ 5 dB
	$f_0 \pm 4.2$	≥ 15 dB		$f_0 \pm 4.5$ ≥ 30 dB	$f_0 \pm 3.25$ ≥ 18 dB
	$f_0 \pm 6$	≥ 40 dB		$f_0 \pm 9$ ≥ 55 dB	$f_0 \pm 9$ ≥ 64 dB
	$f_0 \pm 12$	≥ 55 dB		$f_0 \pm 15$ ≥ 65 dB	
Group delay variation	Δτ ≤ 600 ns		Δτ ≤ 500 ns	Δτ ≤ 400 ns
Wide band input	7-16 female			
Average input power	1 kW Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input			
DTV Mask filtering	no			
Insertion loss	≤ 0.1 dB (non adjacent)			
Output	7-16 female			
Peak output voltage	≤ 2.8 kV			
Isolation between inputs	≥ 35 dB			
VSWR (one WB channel)	≤ 1.06			
Dimensions (L x W x H) mm	355 x 483 x 133 (3RU)			
Weight	≈ 14 kg			
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

UHF CIB COMBINERS

- compact design as 19" slide-in unit
- for 6, 7 and 8 MHz channel bandwidth
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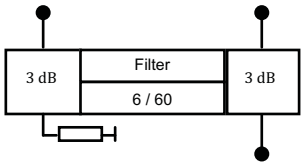
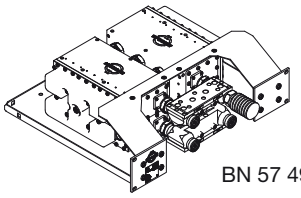
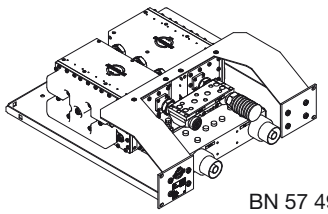
- adjacent channel operation
- temperature compensated
- tuneable within the whole UHF range

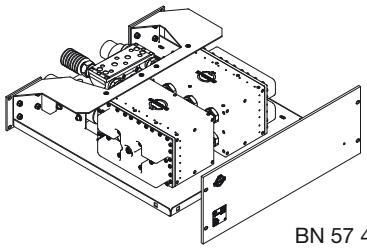




BN 57 49 48



BN 57 49 49

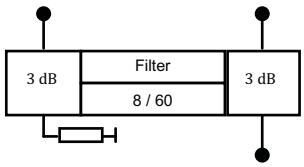


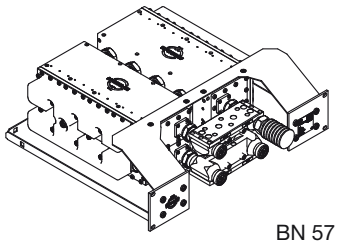
BN 57 49 49 C0002

Part number Front plate design	**BN 57 49 48** without front plate **BN 57 49 48 C0002** with front plate and rear side ports	**BN 57 49 49** without front plate **BN 57 49 49 C0002** with front plate and rear side ports
Frequency range	470 - 860 MHz	
Channel spacing	≥ 0	
Narrow band input	7-16 female	
Filter type integrated cavities/size	**6/60 ≡ BN616566**	
Temperature stability	≤ 2 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 1200 MHz	
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB) / ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 750 W**	**≤ 600 W** / **≤ 600 W**
Tuning instruction	AS6201	AS6192 / AS6257
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 860 MHz f_0 ≤ 0.55 dB / ≤ 0.65 dB $f_0 \pm 3.805$ ≤ 1.35 dB / ≤ 1.85 dB $f_0 \pm 3.885$ ≤ 1.55 dB / ≤ 2.1 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	470 MHz / 803 MHz f_0 ≤ 0.7 dB / ≤ 0.85 dB $f_0 \pm 2.79$ ≤ 1.7 dB / ≤ 2.30 dB $f_0 \pm 3.0$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB
		470 MHz / 803 MHz f_0 ≤ 0.8 dB / ≤ 1.1 dB $f_0 \pm 2.69$ ≤ 1.5 dB / ≤ 1.8 dB $f_0 \pm 3.0$ ≤ 2.7 dB / ≤ 2.8 dB $f_0 \pm 3.25$ ≥ 4 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 9$ ≥ 65 dB
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 350 ns / Δτ ≤ 200 ns
Wide band input	7-16 female	1 5/8" SMS unflanged
Average input power	≤ 1 kW	≤ 4 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output	7-16 female	1 5/8" SMS unflanged
Peak output voltage	≤ 1.6 kV	≤ 6 kV
Isolation between inputs	≥ 35 dB	
VSWR (one WB channel)	≤ 1.06	
Dimensions (L x W x H) mm	482 x 483 x 177 (4RU)	510 x 483 x 177 (4RU)
Weight	≈ 17 kg	≈ 20 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

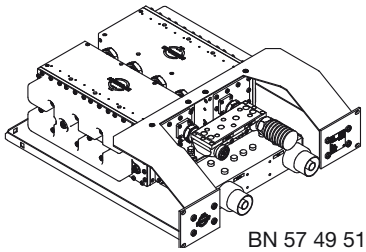
UHF CIB COMBINERS

- compact design as 19" slide-in unit
- for 6, 7 and 8 MHz channel bandwidth
- integrated mask filters for DTV
- adjacent channel operation
- temperature compensated
- tuneable within the whole UHF range

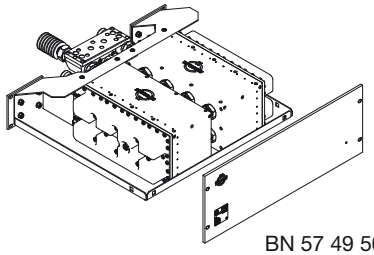




BN 57 49 50



BN 57 49 51



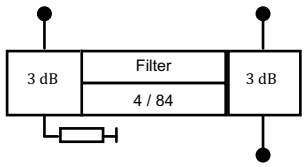
BN 57 49 50 C0002

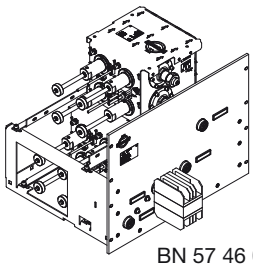
Part number Front plate design	**BN 57 49 50** without front plate **BN 57 49 50 C0002** with front plate and rear side ports	**BN 57 49 51** without front plate **BN 57 49 51 C0002** with front plate and rear side ports
Frequency range	470 - 860 MHz	
Channel spacing	≥ 0	
Narrow band input	7-16 female	
Filter type integrated cavities/size	**8/60 ≡ BN 616568**	
Temperature stability	≤ 2 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 1200 MHz	
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 750 W**	**≤ 600 W**
Tuning instruction	AS8087	AS8095
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.75 dB ≤ 1.00 dB $f_0 \pm 3.805$ ≤ 2.35 dB ≤ 3.15 dB $f_0 \pm 3.885$ ≤ 3.05 dB ≤ 3.85 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.85 dB ≤ 1.15 dB $f_0 \pm 2.79$ ≤ 2.25 dB ≤ 3.10 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9$ ≥ 55 dB
Group delay variation	Δτ ≤ 660 ns	Δτ ≤ 500 ns
Wide band input	7-16 female	1 5/8" SMS unflanged
Average input power	≤ 1 kW	≤ 4 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output	7-16 female	1 5/8" SMS unflanged
Peak output voltage	≤ 1.6 kV	≤ 6 kV
Isolation between inputs	≥ 35 dB	
VSWR (one WB channel)	≤ 1.06	
Dimensions (L x W x H) mm	482 x 483 x 177 (4RU)	510 x 483 x 177 (4RU)
Weight	≈ 20 kg	≈ 22 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 600 W**
Tuning instruction	AS8084
Insertion loss & Mask filtering	470 MHz 803 MHz f_0 ≤ 1.10 dB ≤ 1.30 dB $f_0 \pm 2.69$ ≤ 2.35 dB ≤ 2.85 dB $f_0 \pm 3.0$ ≥ 4 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB
Group delay variation	Δτ ≤ 420 ns

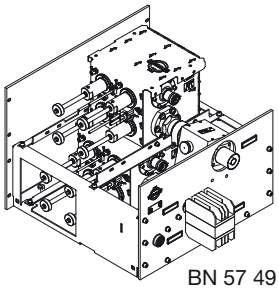
UHF CIB COMBINERS

- compact design as 19" slide-in unit
- suitable for analogue and digital TV
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range





BN 57 46 03 C0001



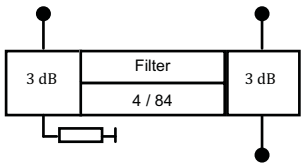
BN 57 49 01 C0002

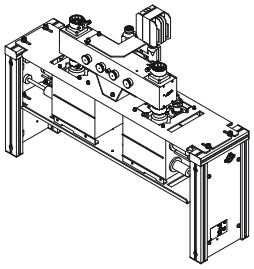
Part number Front plate design	**BN 57 46 03 C0001** with ports at front plate **BN 57 46 03 C0002** with ports at rear side	**BN 57 49 01 C0001** with ports at front plate **BN 57 49 01 C0002** with ports at rear side
Frequency range	470 - 860 MHz	
Channel spacing	≥ 1	
Narrow band input	7-16 female	
Filter type integrated cavities/size	**4/84 ≡ BN616400**	
Temperature stability	≤ 2 kHz / K	
Harmonics attenuation	≥ 45 dB for f ≤ 950 MHz	
DTV Mask filtering	no	
Channel width	8 MHz ($\hat{U}/U_{rms}$=13 dB)	6 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 1.5 kW**	**≤ 1.5 kW**
Tuning instruction	AS4055	AS4038
Insertion loss (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.4 dB ≤ 0.45 dB $f_0 \pm 3.805$ ≤ 0.5 dB ≤ 0.6 dB $f_0 \pm 3.885$ ≤ 0.5 dB ≤ 0.6 dB $f_0 \pm 12$ ≥ 28 dB	470 MHz 860 MHz f_0 ≤ 0.45 dB ≤ 0.55 dB $f_0 \pm 3$ ≤ 0.60 dB ≤ 0.75 dB $f_0 \pm 9$ ≥ 30 dB
Group delay variation	Δτ ≤ 90 ns	Δτ ≤ 100 ns
Wide band input	7-16 female	1 5/8" SMS unflanged
Average input power	≤ 1 kW	≤ 7 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output	7-16 female	1 5/8" SMS unflanged
Average output power	–	≤ 7 kW
Peak output voltage	≤ 1.6 kV	≤ 8.5 kV
Isolation between inputs	≥ 35 dB	
VSWR (one WB channel)	≤ 1.06	
Dimensions (L x W x H) mm	503 x 483 x 355 (8RU)	560 x 483 x 355 (8RU)
Weight	≈ 25 kg	≈ 28 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

Data subject to change without notice – Edition E

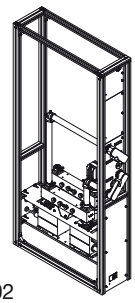
CCS UHF CIB COMBINERS

- **CCS** compact design
- suitable for analogue and digital TV
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range





BN 57 46 73 C0002

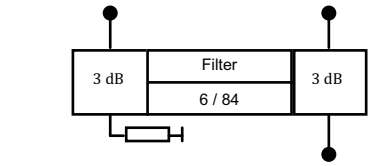


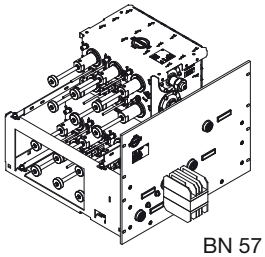
BN 57 46 74 inside switching rack

Part number	**BN 57 46 73 C0002**	**BN 57 46 74 C0002**
Frequency range	470 - 860 MHz	
Channel spacing	≥ 1	
Narrow band input	7-16 female	1 5/8" SMS unflanged
Filter type integrated cavities/size	**4/84 ≡ BN616400**	
Temperature stability	≤ 2 kHz / K	
Harmonics attenuation	≥ 45 dB for f ≤ 950 MHz	
DTV Mask filtering	no	
Channel width	8 MHz ($\hat{U}/U_{rms}$=13 dB)	6 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 1.5 kW** BN 5746 73 C0002 **≤ 2.5 kW** BN 5746 74 C0002	**≤ 1.5 kW** BN 5746 73 C0002 **≤ 2.5 kW** BN 5746 74 C0002
Tuning instruction	AS4055	AS4038
Insertion loss (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.4 dB ≤ 0.45 dB f_0 ± 3.805 ≤ 0.5 dB ≤ 0.6 dB f_0 ± 3.885 ≤ 0.5 dB ≤ 0.6 dB f_0 ± 12 ≥ 28 dB	470 MHz 860 MHz f_0 ≤ 0.45 dB ≤ 0.55 dB f_0 ± 3 ≤ 0.60 dB ≤ 0.75 dB f_0 ± 9 ≥ 30 dB
Group delay variation	Δτ ≤ 90 ns	Δτ ≤ 100 ns
Wide band input	1 5/8" SMS unflanged	
Average input power	≤ 7 kW Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input	
DTV Mask filtering	no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output	1 5/8" SMS unflanged	
Average output power	≤ 7 kW	
Peak output voltage	≤ 8.5 kV	
Isolation between inputs	≥ 35 dB	
VSWR (one WB channel)	≤ 1.06	
Dimensions (L x W x H) mm	900 x 226 x 660	900 x 226 x 965
Weight	≈ 30 kg	≈ 40 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

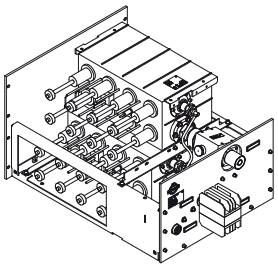
UHF CIB COMBINERS

- compact design as 19" slide-in unit
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range





BN 57 46 41 C0001



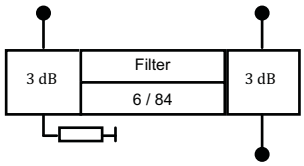
BN 57 49 42 C0001

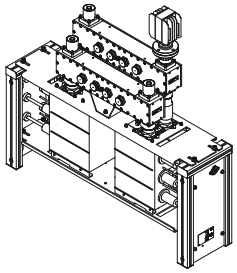
Part number Front plate design	**BN 57 46 41 C0001** with ports at front plate **BN 57 46 41 C0002** with ports at rear side	**BN 57 49 42 C0001** with ports at front plate **BN 57 49 42 C0002** with ports at rear side
Frequency range	470 - 860 MHz	
Channel spacing	≥ 0	
Narrow band input	7-16 female	
Filter type integrated cavities/size	**6/84 ≡ BN616402**	
Temperature stability	≤ 2 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 950 MHz	
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB) / ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 1.5 kW**	**≤ 1.2 kW** / **≤ 1.2 kW**
Tuning instruction	AS6186	AS6182 / AS6156
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 860 MHz f_0 ≤ 0.5 dB / ≤ 0.6 dB $f_0 \pm 3.805$ ≤ 1.2 dB / ≤ 1.5 dB $f_0 \pm 3.885$ ≤ 1.3 dB / ≤ 1.6 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	470 MHz / 803 MHz f_0 ≤ 0.6 dB / ≤ 0.8 dB $f_0 \pm 2.79$ ≤ 1.6 dB / ≤ 2.2 dB $f_0 \pm 3.0$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB / 470 MHz / 803 MHz f_0 ≤ 0.7 dB / ≤ 0.9 dB $f_0 \pm 2.69$ ≤ 1.1 dB / ≤ 1.55 dB $f_0 \pm 3.0$ ≤ 1.9 dB / ≤ 2.45 dB $f_0 \pm 3.25$ ≥ 4 dB $f_0 \pm 3.5$ ≥ 8 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 9$ ≥ 65 dB
Group delay variation	Δτ ≤ 330 ns	Δτ ≤ 500 ns / Δτ ≤ 200 ns
Wide band input	7-16 female	1 5/8" SMS unflanged
Average input power	≤ 1 kW	≤ 7 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output	7-16 female	1 5/8" SMS unflanged
Average output power	–	≤ 7 kW
Peak output voltage	≤ 1.6 kV	≤ 8.5 kV
Isolation between inputs	≥ 35 dB	
VSWR (one WB channel)	≤ 1.06	
Dimensions (L x W x H) mm	586 x 483 x 355 (8RU)	643 x 483 x 355 (8RU)
Weight	≈ 30 kg	≈ 32 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

Data subject to change without notice – Edition E

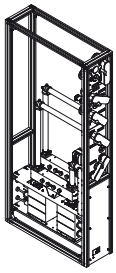
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range





BN 57 46 76 C0002

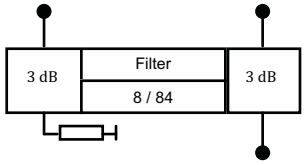


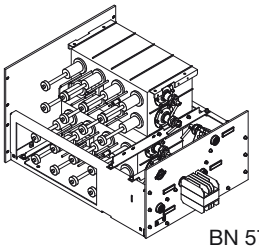
BN 57 46 76 inside switching rack

Part number	**BN 57 46 75 C0005**	**BN 57 46 76 C0002**
Frequency range	470 - 860 MHz	
Channel spacing	≥ 0	
Narrow band input	7-16 female	1 5/8" SMS unflanged
Filter type integrated cavities/size	**6/84 ≡ BN616402**	
Temperature stability	≤ 2 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 950 MHz	
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB) / ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 1.5 kW**	**≤ 1.2 kW** / **≤ 1.2 kW**
Tuning instruction	AS6186	AS6182 / AS6156
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 860 MHz f_0 ≤ 0.5 dB / ≤ 0.6 dB $f_0 \pm 3.805$ ≤ 1.2 dB / ≤ 1.5 dB $f_0 \pm 3.885$ ≤ 1.3 dB / ≤ 1.6 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	470 MHz / 803 MHz f_0 ≤ 0.6 dB / ≤ 0.8 dB $f_0 \pm 2.79$ ≤ 1.6 dB / ≤ 2.2 dB $f_0 \pm 3.0$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB 470 MHz / 803 MHz f_0 ≤ 0.7 dB / ≤ 0.9 dB $f_0 \pm 2.69$ ≤ 1.1 dB / ≤ 1.55 dB $f_0 \pm 3.0$ ≤ 1.9 dB / ≤ 2.45 dB $f_0 \pm 3.25$ ≥ 4 dB $f_0 \pm 3.5$ ≥ 8 dB $f_0 \pm 4$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 9$ ≥ 65 dB
Group delay variation	Δτ ≤ 330 ns	Δτ ≤ 500 ns / Δτ ≤ 200 ns
Wide band input	1 5/8" SMS unflanged	
Average input power	≤ 7 kW Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input	
DTV Mask filtering	no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output	1 5/8" SMS unflanged	
Average output power	≤ 7 kW	
Peak output voltage	≤ 8.5 kV	
Isolation between inputs	≥ 35 dB	
VSWR (one WB channel)	≤ 1.06	
Dimensions (L x W x H) mm	900 x 226 x 665	900 x 226 x 965
Weight	≈ 30 kg	≈ 40 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

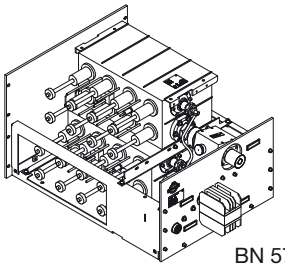
UHF CIB COMBINERS

- compact design as 19" slide-in unit
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range





BN 57 46 43 C0002



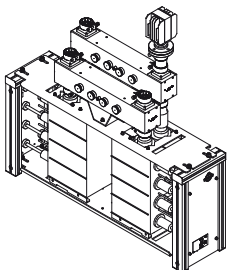
BN 57 49 44 C0002

Part number Front plate design	**BN 57 46 43 C0001** with ports at front plate **BN 57 46 43 C0002** with ports at rear side		**BN 57 49 44 C0001** with ports at front plate **BN 57 49 44 C0002** with ports at rear side
Frequency range	470 - 860 MHz		
Channel spacing	≥ 0		
Narrow band input	7-16 female		
Filter type integrated cavities/size	**8/84 ≡ BN616403**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 950 MHz		
DTV Mask filtering	DVB-T @ 8 MHz (Û/U_{rms}=13 dB)	ISDB-T @ 6 MHz (Û/U_{rms}=13 dB)	ATSC @ 6 MHz (Û/U_{rms}=11 dB)
Average input power	**≤ 1.5 kW**	**≤ 1.2 kW**	**≤ 1.2 kW**
Tuning instruction	AS8068	AS8091	AS8051
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 860 MHz f_0 ≤ 0.6 dB / ≤ 0.75 dB f_0 ± 3.805 ≤ 1.8 dB / ≤ 2.2 dB f_0 ± 3.885 ≤ 2.1 dB / ≤ 2.6 dB f_0 ± 4.2 ≥ 15 dB f_0 ± 6 ≥ 40 dB f_0 ± 12 ≥ 55 dB	470 MHz / 803 MHz f_0 ≤ 0.7 dB / ≤ 1.3 dB f_0 ± 2.79 ≤ 1.8 dB / ≤ 3.1 dB f_0 ± 3.15 ≥ 15 dB f_0 ± 4.5 ≥ 30 dB f_0 ± 9 ≥ 55 dB	470 MHz / 803 MHz f_0 ≤ 0.9 dB / ≤ 1.3 dB f_0 ± 2.69 ≤ 1.9 dB / ≤ 2.7 dB f_0 ± 3.0 ≤ 3 dB f_0 ± 3.25 ≥ 18 dB f_0 ± 9 ≥ 64 dB
Group delay variation	Δτ ≤ 600 ns	Δτ ≤ 500 ns	Δτ ≤ 400 ns
Wide band input	7-16 female		1 5/8" SMS unflanged
Average input power	≤ 1 kW		≤ 7 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output	7-16 female		1 5/8" SMS unflanged
Average output power	–		≤ 7 kW
Peak output voltage	≤ 1.6 kV		≤ 8.5 kV
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	726 x 483 x 355 (8RU)		
Weight	≈ 35 kg		≈ 38 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

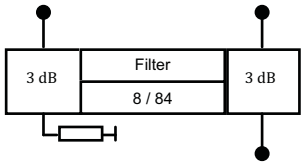
Data subject to change without notice – Edition E

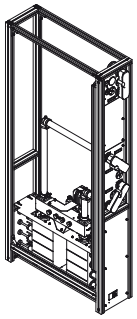
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range



BN 57 46 78 C0002



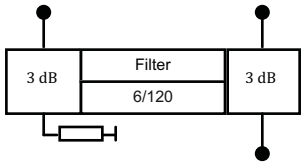


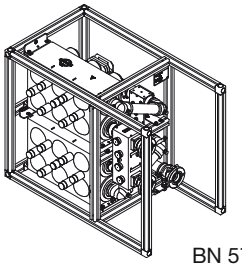
BN 57 46 77 inside switching rack

Part number	**BN 57 46 77 C0005**	**BN 57 46 78 C0002**
Frequency range	470 - 860 MHz	
Channel spacing	≥ 0	
Narrow band input	7-16 female	1 5/8" SMS unflanged
Filter type integrated cavities/size	**8/84 ≡ BN616403**	
Temperature stability	≤ 2 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 950 MHz	
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB) / ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 1.5 kW**	**≤ 1.2 kW** / **≤ 1.2 kW**
Tuning instruction	AS8068	AS8091 / AS8051
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 860 MHz f_0 ≤ 0.6 dB / ≤ 0.75 dB $f_0 \pm 3.805$ ≤ 1.8 dB / ≤ 2.2 dB $f_0 \pm 3.885$ ≤ 2.1 dB / ≤ 2.6 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	470 MHz / 803 MHz f_0 ≤ 0.7 dB / ≤ 1.3 dB $f_0 \pm 2.79$ ≤ 1.8 dB / ≤ 3.1 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9$ ≥ 55 dB 470 MHz / 803 MHz f_0 ≤ 0.9 dB / ≤ 1.3 dB $f_0 \pm 2.69$ ≤ 1.9 dB / ≤ 2.7 dB $f_0 \pm 3.0$ ≤ 3 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB
Group delay variation	Δτ ≤ 600 ns	Δτ ≤ 500 ns / Δτ ≤ 400 ns
Wide band input	1 5/8" SMS unflanged	
Average input power	≤ 7 kW Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input	
DTV Mask filtering	no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output	1 5/8" SMS unflanged	
Average output power	≤ 7 kW	
Peak output voltage	≤ 8.5 kV	
Isolation between inputs	≥ 35 dB	
VSWR (one WB channel)	≤ 1.06	
Dimensions (L x W x H) mm	900 x 226 x 665	900 x 226 x 965
Weight	≈ 35 kg	≈ 45 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

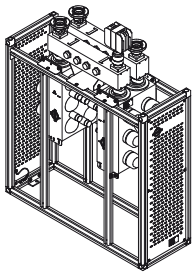
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range

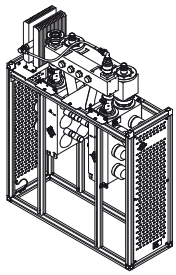




BN 57 55 11 A0070



BN 57 55 12 A0040

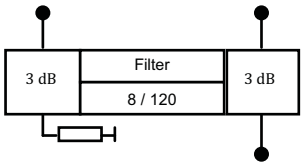


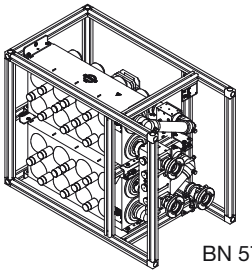
BN 57 55 13 A0040

Part number / Size	**BN 57 55 11 A0070** 448	**BN 57 55 12 A0030** 700 **BN 57 55 12 A0040** 900	**BN 57 55 13 A0030** 700 **BN 57 55 13 A0040** 900
Frequency range	470 - 860 MHz		
Channel spacing	≥ 0		
Narrow band input	1 5/8" EIA		
Filter type integrated cavities/size	**6/120 ≡ BN 616663**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 1100 MHz		
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 3.2 kW**	**≤ 2.6 kW**	**≤ 2.6 kW**
Tuning instruction	AS6224	AS6229	AS6228
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.4 dB ≤ 0.5 dB $f_0 \pm 3.805$ ≤ 0.9 dB ≤ 1.2 dB $f_0 \pm 3.885$ ≤ 1.0 dB ≤ 1.4 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	470 MHz 803 MHz f_0 ≤ 0.45 dB ≤ 0.6 dB $f_0 \pm 2.79$ ≤ 1.20 dB ≤ 1.5 dB $f_0 \pm 3.0$ ≥ 3 dB $f_0 \pm 3.15$ ≥ 5 dB $f_0 \pm 4.5$ ≥ 17 dB $f_0 \pm 9$ ≥ 38 dB $f_0 \pm 15$ ≥ 48 dB	470 MHz 803 MHz f_0 ≤ 0.50 dB ≤ 0.65 dB $f_0 \pm 2.69$ ≤ 0.65 dB ≤ 1.40 dB $f_0 \pm 3.5$ ≥ 3 dB $f_0 \pm 4$ ≥ 8 dB $f_0 \pm 6$ ≥ 30 dB $f_0 \pm 9$ ≥ 65 dB
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 450 ns	Δτ ≤ 250 ns
Wide band input	1 5/8" EIA		3 1/8" EIA male
Average input power	≤ 7 kW		≤ 17.5 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output	1 5/8" EIA		3 1/8" EIA male
Peak output voltage	≤ 8.5 kV		≤ 12.5 kV
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	800 x 448 x 617	700 x 315 x 1200 BN 57 55 12 A0030 900 x 315 x 1200 BN 57 55 12 A0040	700 x 315 x 1200 BN 57 55 13 A0030 900 x 315 x 1200 BN 57 55 13 A0040
Weight	≈ 70 kg		≈ 80 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

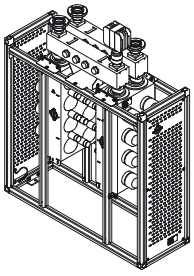
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range

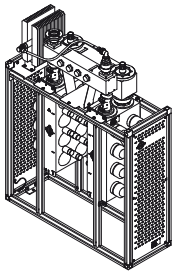




BN 57 55 15 A0070



BN 57 55 16 A0040

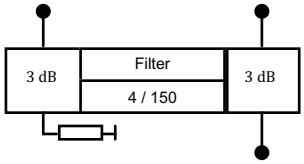


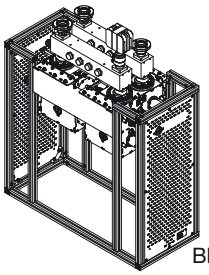
BN 57 55 17 A0040

Part number / Size	**BN 57 55 15 A0070** 448	**BN 57 55 16 A0030** 700 **BN 57 55 16 A0040** 900	**BN 57 55 17 A0030** 700 **BN 57 55 17 A0040** 900
Frequency range	470 - 860 MHz		
Channel spacing	≥ 0		
Narrow band input	1 5/8" EIA		
Filter type integrated cavities/size	**8/120 ≡ BN 616664**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 1100 MHz		
DTV Mask filtering	DVB-T @ 8 MHz (Û/U_{rms}=13 dB)	ISDB-T @ 6 MHz (Û/U_{rms}=13 dB)	ATSC @ 6 MHz (Û/U_{rms}=11 dB)
Average input power	**≤ 3.2 kW**	**≤ 2.6 kW**	**≤ 2.6 kW**
Tuning instruction	AS8112	AS8117	AS8115
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.5 dB ≤ 0.6 dB f_0 ± 3.805 ≤ 1.5 dB ≤ 1.8 dB f_0 ± 3.885 ≤ 1.6 dB ≤ 2.0 dB f_0 ± 4.2 ≥ 15 dB f_0 ± 6 ≥ 40 dB f_0 ± 12 ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.55 dB ≤ 0.7 dB f_0 ± 2.79 ≤ 1.30 dB ≤ 1.8 dB f_0 ± 3.15 ≥ 15 dB f_0 ± 4.5 ≥ 30 dB f_0 ± 9 ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.6 dB ≤ 0.7 dB f_0 ± 2.69 ≤ 1.3 dB ≤ 1.6 dB f_0 ± 3 ≥ 4 dB f_0 ± 3.25 ≥ 18 dB f_0 ± 9 ≥ 64 dB
Group delay variation	Δτ ≤ 550 ns	Δτ ≤ 600 ns	Δτ ≤ 400 ns
Wide band input	1 5/8" EIA		3 1/8" EIA male
Average input power	≤ 7 kW		≤ 17.5 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output	1 5/8" EIA		3 1/8" EIA male
Peak output voltage	≤ 8.5 kV		≤ 12.5 kV
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	800 x 448 x 617	700 x 315 x 1200 BN 57 55 16 A0030 900 x 315 x 1200 BN 57 55 16 A0040	700 x 315 x 1200 BN 57 55 17 A0030 900 x 315 x 1200 BN 57 55 17 A0040
Weight	≈ 75 kg	≈ 80 kg	≈ 90 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

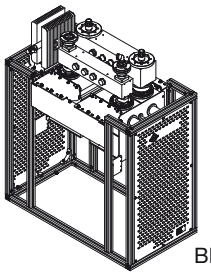
CCS UHF CIB COMBINERS

- **CCS** compact design
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range

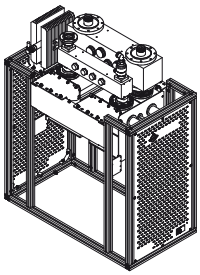




BN 57 49 02 A0000



BN 57 49 32 A0010



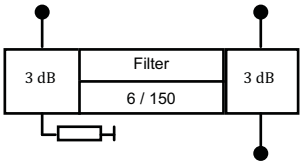
BN 57 49 33 A0010

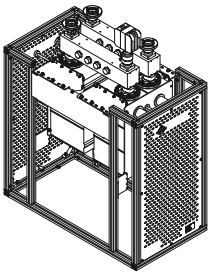
Part number	**BN 57 49 02 A0000**	**BN 57 49 32 A0010**	**BN 57 49 33 A0010**
Frequency range	470 - 860 MHz		
Channel spacing	≥ 1		
Narrow band input	1 5/8" EIA		
Filter type integrated cavities/size	**4/150 ≡ BN 6164 04**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 40 dB for f ≤ 860 MHz		
DTV mask filtering	no		
Channel width	8 MHz ($\hat{U}/U_{rms}$=13 dB)		6 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 7 kW ATV ≤ 5 kW DTV**		**≤ 7 kW ATV ≤ 5 kW DTV**
Tuning instruction	AS4005		AS4034
Insertion loss (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.30 dB ≤ 0.35 dB $f_0 \pm 3.885$ ≤ 0.35 dB ≤ 0.40 dB $f_0 \pm 12$ ≥ 12 dB		470 MHz 803 MHz f_0 ≤ 0.35 dB ≤ 0.45 dB $f_0 \pm 3.0$ ≤ 0.45 dB ≤ 0.50 dB
Group delay variation	Δτ ≤ 30 ns		Δτ ≤ 40 ns
Wide band input	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male
Average input power	≤ 7 kW	≤ 17.5 kW	≤ 33 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output Peak output voltage Average output power	1 5/8" EIA ≤ 8.5 kV ≤ 7 kW	3 1/8" EIA male ≤ 12.5 kV –	4 1/2" EIA male ≤ 15.5 kV –
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	900 x 390 x 1200	900 x 480 x 1200	900 x 480 x 1200
Weight	≈ 80 kg	≈ 90 kg	≈ 100 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

Data subject to change without notice – Edition E

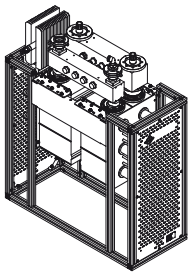
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for ATSC
- for 6 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range





BN 57 46 72 A0070

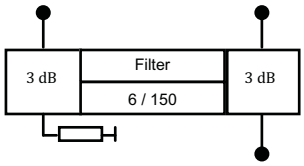


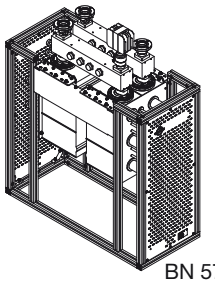
BN 57 46 62 A0000

Part number	**BN 57 46 72 A0010**	**BN 57 46 62 A0000**
Frequency range	470 - 860 MHz	
Channel spacing	≥ 1	
Narrow band input	1 5/8" EIA	
Filter type integrated cavities/size	**6/150 ≡ BN 616572**	
Temperature stability	≤ 2 kHz / K	
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz	
DTV mask filtering	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)	
Average input power	**≤ 4.5 kW**	
Tuning instruction	AS6081	
Insertion loss & Mask filtering (alternative tuning on request)	470 / 860 f_0 ≤ 0.5 dB / ≤ 0.6dB $f_0 \pm 3.805$ ≤ 1.5 dB / ≤ 1.8 dB $f_0 \pm 3.885$ ≤ 1.6 dB / ≤ 2.0 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	
Group delay variation	Δτ ≤ 200 ns	
Wide band input	1 5/8" EIA	3 1/8" EIA male
Average input power	≤ 7 kW	≤ 17.5 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input	
DTV Mask filtering	no	
Insertion loss	≤ 0.1 dB (non adjacent)	
Output Peak output voltage Average output power	1 5/8" EIA ≤ 8.5 kV ≤ 7 kW	3 1/8" EIA male ≤ 12.5 kV –
Isolation between inputs	≥ 35 dB	
VSWR (one WB channel)	≤ 1.06	
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 390 x 1200
Weight	≈ 95 kg	≈ 105 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range

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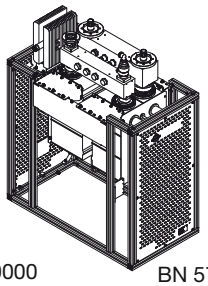
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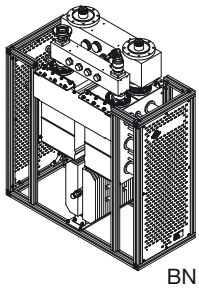
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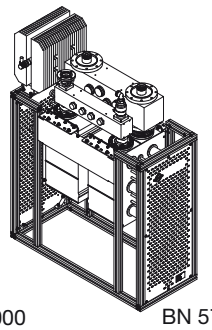
BN 57 49 35 A0010

Part number / Width	**BN 57 49 47 A0000** 390 **BN 57 49 47 A0010** 480	**BN 57 49 34 A0000** 390 **BN 57 49 34 A0010** 480	**BN 57 49 35 A0000** 390 **BN 57 49 35 A0010** 480
Frequency range	470 - 860 MHz		
Channel spacing	≥ 0		
Narrow band input	1 5/8" EIA		
Filter type integrated cavities/size	**6/150 ≡ BN 616518**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz		
DTV Mask filtering	DVB-T @ 8 MHz (Û/U_{rms}=13 dB)	ISDB-T @ 6 MHz (Û/U_{rms}=13 dB)	DVB-T @ 7 MHz (Û/U_{rms}=13 dB)
Average input power	**≤ 5 kW**	**≤ 4 kW**	**≤ 4.5 kW**
Tuning instruction	AS6193	AS6184	AS6289
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.40 dB ≤ 0.55 dB f_0 ± 3.805 ≤ 0.85 dB ≤ 1.3 dB f_0 ± 3.885 ≤ 1.05 dB ≤ 1.5 dB f_0 ± 4.2 ≥ 4 dB f_0 ± 6 ≥ 20 dB f_0 ± 12 ≥ 40 dB	470 MHz 803 MHz f_0 ≤ 0.5 dB ≤ 0.7 dB f_0 ± 2.79 ≤ 1.2 dB ≤ 1.6 dB f_0 ± 3.0 ≥ 3.5 dB f_0 ± 3.15 ≥ 8 dB f_0 ± 4.5 ≥ 23 dB f_0 ± 9 ≥ 48 dB f_0 ± 15 ≥ 50 dB	470 MHz 820 MHz f_0 ≤ 0.45 dB ≤ 0.6 dB f_0 ± 3.2 ≤ 0.65 dB ≤ 0.95 dB f_0 ± 4.2 ≥ 13 dB f_0 ± 10.5 ≥ 38 dB
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 500 ns	Δτ ≤ 150 ns
Wide band input	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male
Average input power	≤ 7 kW	≤ 17.5 kW	≤ 33 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male
Peak output voltage	≤ 8.5 kV	≤ 12.5 kV	≤ 15.5 kV
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	900 x 390 x 1200 BN 57 49 47 A0000 900 x 480 x 1200 BN 57 49 47 A0010	900 x 390 x 1200 BN 57 49 34 A0000 900 x 480 x 1200 BN 57 49 34 A0010	900 x 390 x 1200 BN 57 49 35 A0000 900 x 480 x 1200 BN 57 49 35 A0010
Weight	≈ 90 kg	≈ 100 kg	≈ 115 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

Data subject to change without notice – Edition E

CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
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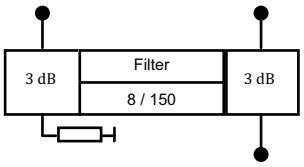

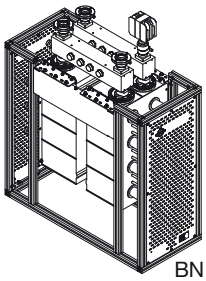
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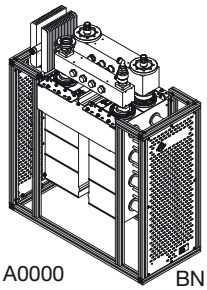
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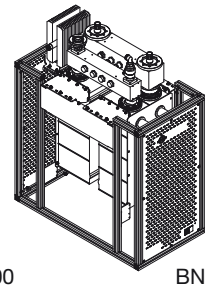
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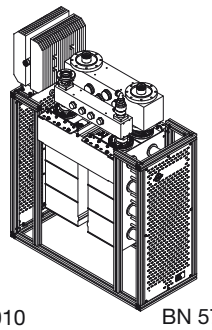
BN 57 49 63 A0000

Part number / Width	**BN 57 49 62 A0000** 390 **BN 57 49 62 A0010** 480	**BN 57 49 61 A0000** 390 **BN 57 49 61 A0010** 480	**BN 57 49 63 A0000** 390 **BN 57 49 63 A0010** 480
Frequency range	470 - 860 MHz		
Channel spacing	≥ 0		
Narrow band input	1 5/8" EIA		
Filter type integrated cavities/size	**8/150 ≡ BN 616542**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz		
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 4 kW**	**≤ 3.2 kW**	**≤ 3.2 kW**
Tuning instruction	AS8071	AS8096	AS8094
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.5 dB ≤ 0.75 dB $f_0 \pm 3.805$ ≤ 1.6 dB ≤ 2.2 dB $f_0 \pm 3.885$ ≤ 1.8 dB ≤ 2.5 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.6 dB ≤ 0.80 dB $f_0 \pm 2.79$ ≤ 1.4 dB ≤ 1.85 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9$ ≥ 55 dB	470 MHz 806 MHz f_0 ≤ 0.8 dB ≤ 1.0 dB $f_0 \pm 2.69$ ≤ 1.6 dB ≤ 1.7 dB $f_0 \pm 3.00$ ≥ 4 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB
Group delay variation	Δτ ≤ 700 ns	Δτ ≤ 500 ns	Δτ ≤ 400 ns
Wide band input	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male
Average input power	≤ 7 kW	≤ 17.5 kW	≤ 33 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male
Peak output voltage	≤ 8.5 kV	≤ 12.5 kV	≤ 15.5 kV
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	900 x 390 x 1200 BN 57 49 62 A0000 900 x 480 x 1200 BN 57 49 62 A0010	900 x 390 x 1200 BN 57 49 61 A0000 900 x 480 x 1200 BN 57 49 61 A0010	900 x 390 x 1200 BN 57 49 63 A0000 900 x 480 x 1200 BN 57 49 63 A0010
Weight	≈ 105 kg	≈ 120 kg	≈ 135kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

CCS UHF CIB COMBINERS

- **CCS** compact design
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- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
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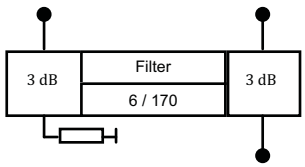
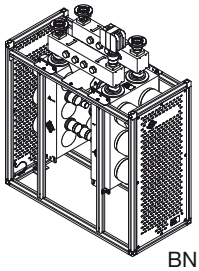
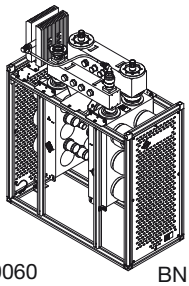




BN 57 55 20 A0060



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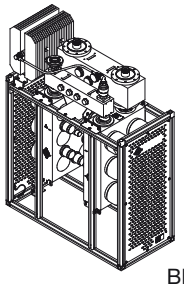

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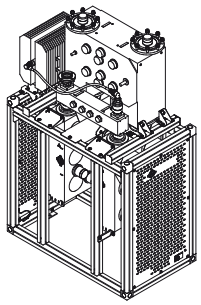


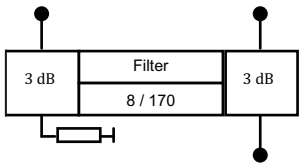
BN 57 55 23 A0020

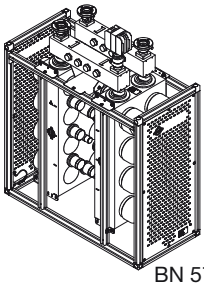
Part number / Width	**BN 57 55 20 A0010** 480 **BN 57 55 20 A0060** 415	**BN 57 55 21 A0010** 480 **BN 57 55 21 A0060** 415	**BN 57 55 22 A0010** 480 **BN 57 55 22 A0060** 415	**BN 57 55 23 A0020** 520
Frequency range	470 - 860 MHz			
Channel spacing	≥ 0			
Narrow band input	1 5/8" EIA			
Filter type integrated cavities/size	**6/170 ≡ BN 616665**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 1000 MHz			
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)		ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 7 kW**	**≤ 6 kW**		**≤ 6 kW**
Tuning instruction	AS6217	AS6222		AS6221
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.35 dB ≤ 0.45 dB $f_0 \pm 3.805$ ≤ 0.85 dB ≤ 1.0 dB $f_0 \pm 3.885$ ≤ 1.00 dB ≤ 1.1 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	470 MHz 803 MHz f_0 ≤ 0.50 dB ≤ 0.60 dB $f_0 \pm 2.79$ ≤ 1.15 dB ≤ 1.35 dB $f_0 \pm 3.0$ ≥ 3 dB $f_0 \pm 3.15$ ≥ 5 dB $f_0 \pm 4.5$ ≥ 17 dB $f_0 \pm 9$ ≥ 38 dB $f_0 \pm 15$ ≥ 48 dB		470 MHz 803 MHz f_0 ≤ 0.45 dB ≤ 0.6 dB $f_0 \pm 2.69$ ≤ 0.65 dB ≤ 0.8 dB $f_0 \pm 3.5$ ≥ 3 dB $f_0 \pm 4$ ≥ 8 dB $f_0 \pm 6$ ≥ 30 dB $f_0 \pm 9$ ≥ 65 dB
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 400 ns		Δτ ≤ 150 ns
Wide band input	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Average input power	≤ 7 kW	≤ 17.5 kW	≤ 33 kW	≤ 60 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no			
Insertion loss	≤ 0.1 dB (non adjacent)			
Output	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Peak output voltage	≤ 8.5 kV	≤ 12.5 kV	≤ 15.5 kV	≤ 19.5 kV
Isolation between inputs	≥ 35 dB			
VSWR (one WB channel)	≤ 1.06			
Dimensions (L x W x H) mm	900 x 480 x 1200 BN 57 55 20 A0010, BN 57 55 21 A0010, BN 57 55 22 A0010 900 x 415 x 1200 BN 57 55 20 A0060, BN 57 55 21 A0060, BN 57 55 22 A0060			900 x 520 x 1400
Weight	≈ 105 kg	≈ 115 kg	≈ 135 kg	≈ 180 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

Data subject to change without notice – Edition E

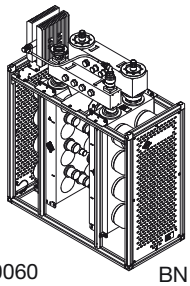
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range





BN 57 55 25 A0060



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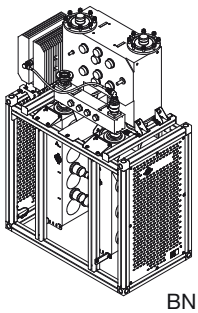
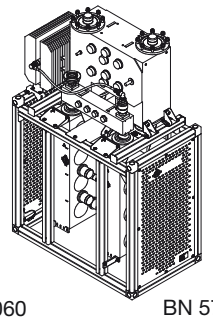


BN 57 55 27 A0060

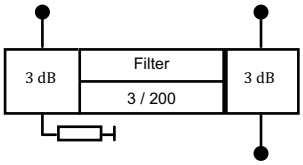


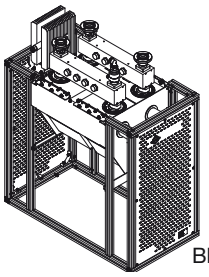
BN 57 55 28 A0020

Part number / Width	**BN 57 55 25 A0010** 480 **BN 57 55 25 A0060** 415	**BN 57 55 26 A0010** 480 **BN 57 55 26 A0060** 415	**BN 57 55 27 A0010** 480 **BN 57 55 27 A0060** 415	**BN 57 55 28 A0020** 520
Frequency range	470 - 860 MHz			
Channel spacing	≥ 0			
Narrow band input	1 5/8" EIA			
Filter type integrated cavities/size	**8/170 ≡ BN 616666**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 1000 MHz			
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)		ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 7 kW**	**≤ 6 kW**		**≤ 6 kW**
Tuning instruction	AS8100	AS8104		AS8103
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.45 dB ≤ 0.55 dB $f_0 \pm 3.805$ ≤ 1.20 dB ≤ 1.9 dB $f_0 \pm 3.885$ ≤ 1.50 dB ≤ 2.1 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.50 dB ≤ 0.6 dB $f_0 \pm 2.79$ ≤ 1.40 dB ≤ 1.8 dB $f_0 \pm 3.15$ ≥ 12 dB $f_0 \pm 4.5$ ≥ 28 dB $f_0 \pm 9$ ≥ 54 dB	470 MHz 803 MHz f_0 ≤ 0.55 dB ≤ 0.65 dB $f_0 \pm 2.69$ ≤ 1.15 dB ≤ 1.50 dB $f_0 \pm 3$ ≥ 4 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB	
Group delay variation	Δτ ≤ 700 ns	Δτ ≤ 650 ns		Δτ ≤ 500 ns
Wide band input	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Average input power	≤ 7 kW	≤ 17.5 kW	≤ 33 kW	≤ 60 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no			
Insertion loss	≤ 0.1 dB (non adjacent)			
Output	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Peak output voltage	≤ 8.5 kV	≤ 12.5 kV	≤ 15.5 kV	≤ 19.5 kV
Isolation between inputs	≥ 35 dB			
VSWR (one WB channel)	≤ 1.06			
Dimensions (L x W x H) mm	900 x 480 x 1200 BN 57 55 25 A0010, BN 57 55 26 A0010, BN 57 55 27 A0010 900 x 415 x 1200 BN 57 55 25 A0060, BN 57 55 26 A0060, BN 57 55 27 A0060			900 x 520 x 1400
Weight	≈ 125 kg	≈ 135 kg	≈ 150 kg	≈ 195 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

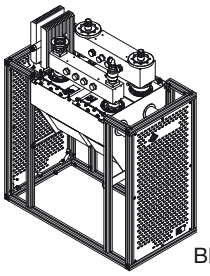
CCS UHF CIB COMBINERS

- **CCS** compact design
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range

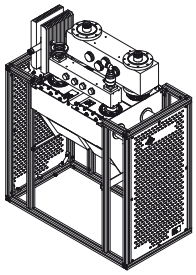




BN 57 42 30 A0010



BN 57 42 29 A0010



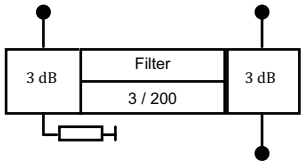
BN 57 42 26 A0010

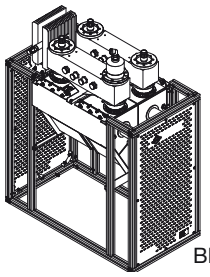
Part number	**BN 57 42 30 A0010**	**BN 57 42 29 A0010**	**BN 57 42 26 A0010**
Frequency range	470 - 860 MHz		
Channel spacing	≥ 2		
Narrow band input	1 5/8" EIA		
Filter type integrated cavities/size	**3/200 ≡ BN 616434**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 25 dB for f ≤ 860 MHz		
DTV mask filtering	no		
Channel width	8 MHz ($\hat{U}/U_{rms}$=13 dB)		6 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 7 kW**		**≤ 7 kW**
Tuning instruction	AS3002		AS3004
Insertion loss (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.15 dB ≤ 0.20 dB $f_0 \pm 3.885$ ≤ 0.20 dB ≤ 0.25 dB $f_0 \pm 20$ ≥ 17 dB		470 MHz 803 MHz f_0 ≤ 0.20 dB ≤ 0.25 dB $f_0 \pm 3.0$ ≤ 0.20 dB ≤ 0.25 dB $f_0 \pm 15$ ≥ 17 dB
Group delay variation	Δτ ≤ 10 ns		Δτ ≤ 10 ns
Wide band input	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male
Average input power	≤ 7 kW	≤ 17.5 kW	≤ 33 kW
DTV Mask filtering	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output Peak output voltage	1 5/8" EIA ≤ 8.5 kV	3 1/8" EIA male ≤ 12.5 kV	4 1/2" EIA male ≤ 15.5 kV
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 480 x 1200	900 x 480 x 1200
Weight	≈ 80 kg	≈ 90 kg	≈ 100 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

Data subject to change without notice – Edition E

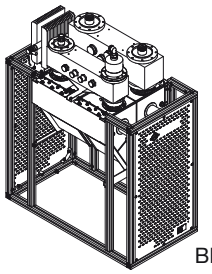
CCS UHF CIB COMBINERS

- **CCS** compact design
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range

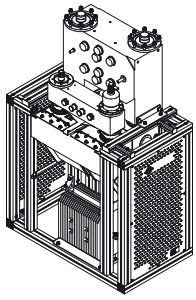




BN 57 42 83 A0010



BN 57 42 81 A0010

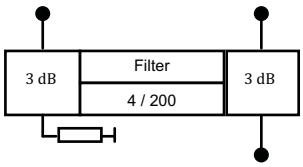


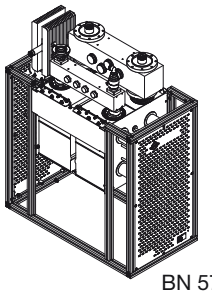
BN 57 42 86 A0020

Part number	**BN 57 42 83 A0010**	**BN 57 42 81 A0010**	**BN 57 42 86 A0020**
Frequency range	470 - 860 MHz		
Channel spacing	≥ 2		
Narrow band input	3 1/8" EIA male		
Filter type integrated cavities/size	**3/200 ≡ BN 616434**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 25 dB for f ≤ 860 MHz		
DTV mask filtering	no		
Channel width	8 MHz ($\hat{U}/U_{rms}$=13 dB)		6 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 20 kW**		**≤ 20 kW**
Tuning instruction	AS3002		AS3004
Insertion loss (alternative tuning on request)	470 MHz / 860 MHz f_0 ≤ 0.15 dB / ≤ 0.20 dB $f_0 \pm 3.885$ ≤ 0.20 dB / ≤ 0.25 dB $f_0 \pm 20$ ≥ 17 dB		470 MHz / 803 MHz f_0 ≤ 0.20 dB / ≤ 0.25 dB $f_0 \pm 3.0$ ≤ 0.20 dB / ≤ 0.25 dB $f_0 \pm 15$ ≥ 17 dB
Group delay variation	Δτ ≤ 10 ns		Δτ ≤ 10 ns
Wide band input	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Average input power	≤ 17 kW	≤ 33 kW	≤ 60 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output Peak output voltage	3 1/8" EIA male ≤ 12.5 kV	4 1/2" EIA male ≤ 15.5 kV	52-120 BT male ≤ 19.5 kV
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 480 x 1200	900 x 480 x 1200
Weight	≈ 95 kg	≈ 115 kg	≈ 155 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

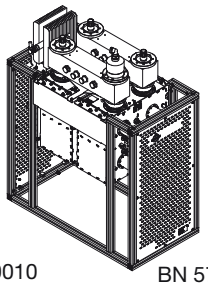
CCS UHF CIB COMBINERS

- **CCS** compact design
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range





BN 57 49 76 A0010



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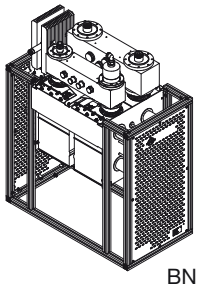

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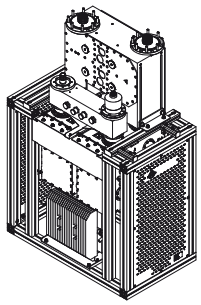


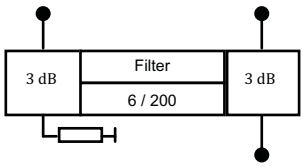
BN 57 49 85 A0020

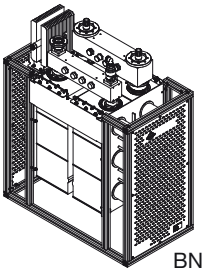
Part number	**BN 57 49 76 A0010**	**BN 57 49 73 A0010**	**BN 57 49 75 A0010**	**BN 57 49 85 A0020**
Frequency range	470 - 860 MHz			
Channel spacing	≥ 1			
Narrow band input	1 5/8" EIA	3 1/8" EIA male		
Filter type integrated cavities/size	**4/200 ≡ BN 616409**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 40 dB for f ≤ 800 MHz			
DTV Mask filtering	no			
Channel width	8 MHz ($\hat{U}/U_{rms}$=13 dB)		6 MHz ($\hat{U}/U_{rms}$=13 dB)	
Average input power	**≤ 7 kW** BN 57 49 76 A0010 **≤ 15 kW** BN 57 49 73 A0010 **≤ 15 kW** BN 57 49 75 A0010 **≤ 15 kW** BN 57 49 85 A0020		**≤ 7 kW** BN 57 49 76 A0010 **≤ 15 kW** BN 57 49 73 A0010 **≤ 15 kW** BN 57 49 75 A0010 **≤ 15 kW** BN 57 49 85 A0020	
Tuning instruction	AS4056		AS4057	
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.25 dB ≤ 0.3 dB $f_0 \pm 3.885$ ≤ 0.25 dB ≤ 0.3 dB $f_0 \pm 12$ ≥ 30 dB		470 MHz 803 MHz f_0 ≤ 0.3 dB ≤ 0.35 dB $f_0 \pm 2.79$ ≤ 0.3 dB ≤ 0.35 dB $f_0 \pm 9$ ≥ 30 dB	
Group delay variation	Δτ ≤ 40 ns		Δτ ≤ 40 ns	
Wide band input	4 1/2" EIA male	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Average input power	≤ 33 kW	≤ 17.5 kW	≤ 33 kW	≤ 60 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input			
DTV Mask filtering	no			
Insertion loss	≤ 0.1 dB (non adjacent)			
Output	4 1/2" EIA male	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Peak output voltage	≤ 15.5 kV	≤ 12.5 kV	≤ 15.5 kV	≤ 19.5 kV
Average output power	–	≤ 23.0 kW	–	–
Isolation between inputs	≥ 35 dB			
VSWR (one WB channel)	≤ 1.06			
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 480 x 1200	900 x 480 x 1200	900 x 520 x 1400
Weight	≈ 120 kg	≈ 115 kg	≈ 125 kg	≈ 180 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

Data subject to change without notice – Edition E

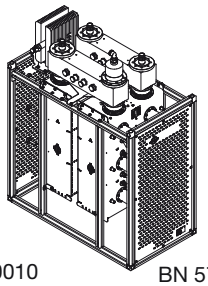
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for ATSC
- for 6 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range
- liquid cooled filter

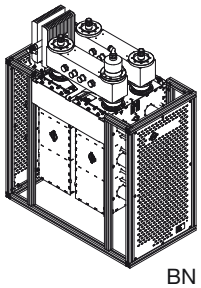




BN 57 49 70 A0010



BN 57 46 71 A0010

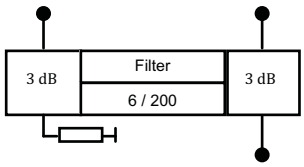


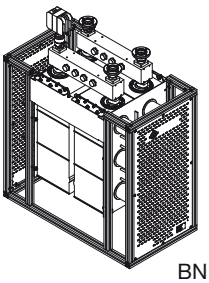
BN 57 46 70 A0010

Part number **Cooling**	**BN 57 49 70 A0010** **natural cooling**	**BN 57 46 71 A0010** **natural cooling**	**BN 57 46 70 A0010** **liquid cooling**
Frequency range	470 - 860 MHz		
Channel spacing	≥ 1		
Narrow band input	1 5/8" EIA	3 1/8" EIA male	3 1/8" EIA male
Filter type integrated cavities/size	**6/200 ≡ BN 616571**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz		
DTV Mask filtering	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)		
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 7 kW**	**≤ 9 kW**	**≤ 20 kW** @ 0 - 600m **≤ 18 kW** @ 1200 m **≤ 16 kW** @ 2000 m **≤ 14 kW** @ 2800 m **≤ 12 kW** @ 3400 m **≤ 10 kW** @ 4000 m
Tuning instruction	AS6082		
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 860 MHz f_0: ≤ 0.5 dB / ≤ 0.70 dB $f_0 \pm 2.69$: ≤ 0.7 dB / ≤ 0.90 dB $f_0 \pm 3$: ≤ 1.5 dB / ≤ 1.85 dB $f_0 \pm 4$: ≥ 15 dB $f_0 \pm 6$: ≥ 40 dB $f_0 \pm 9$: ≥ 65 dB		
Group delay variation	Δτ ≤ 200 ns		
Wide band input	3 1/8" EIA male		
Average input power	≤ 17.5 kW Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output Peak output voltage Average output power	3 1/8" EIA male ≤ 12.5 kV ≤ 23.0 kW		
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 480 x 1200	900 x 480 x 1200
Weight	≈ 135 kg	≈ 150 kg	≈ 150 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

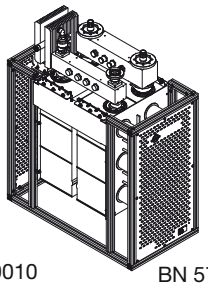
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range

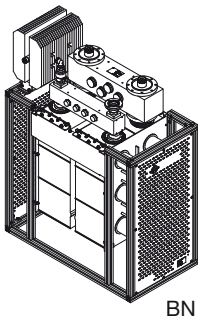




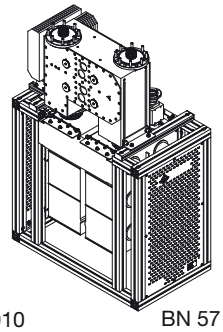
BN 57 46 93 A0010



BN 57 46 94 A0010



BN 57 46 95 A0010



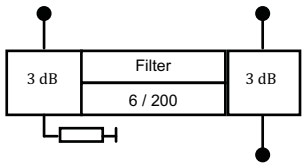
BN 57 46 96 A0020

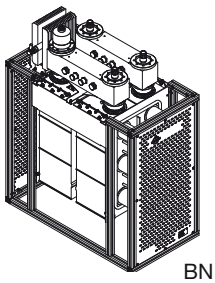
Part number	**BN 57 46 93 A0010**	**BN 57 46 94 A0010**	**BN 57 46 95 A0010**	**BN 57 46 96 A0020**
Frequency range	470 - 860 MHz			
Channel spacing	≥ 0			
Narrow band input	1 5/8" EIA			
Filter type integrated cavities/size	**6/200 ≡ BN 616540**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz			
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)		DVB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 7 kW**	**≤ 7 kW**		**≤ 7 kW**
Tuning instruction	AS6194	AS6185		AS6290
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 860 MHz f_0 ≤ 0.30 dB / ≤ 0.45 dB $f_0 \pm 3.805$ ≤ 0.70 dB / ≤ 1.00 dB $f_0 \pm 3.885$ ≤ 0.85 dB / ≤ 1.15 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	470 MHz / 803 MHz f_0 ≤ 0.4 dB / ≤ 0.55 dB $f_0 \pm 2.79$ ≤ 1.0 dB / ≤ 1.40 dB $f_0 \pm 3.0$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB		470 MHz / 820 MHz f_0 ≤ 0.30 dB / ≤ 0.40 dB $f_0 \pm 3.2$ ≤ 0.45 dB / ≤ 0.55 dB $f_0 \pm 4.2$ ≥ 13 dB $f_0 \pm 10.5$ ≥ 38 dB
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 500 ns		Δτ ≤ 150 ns
Wide band input	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Average input power	≤ 7 kW	≤ 17.5 kW	≤ 33 kW	≤ 60 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input			
DTV Mask filtering	no			
Insertion loss	≤ 0.1 dB (non adjacent)			
Output	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Peak output voltage Average output power	≤ 8.5 kV ≤ 7 kW	≤ 12.5 kV –	≤ 15.5 kV –	≤ 19.5 kV –
Isolation between inputs	≥ 35 dB			
VSWR (one WB channel)	≤ 1.06			
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 480 x 1200	900 x 480 x 1200	900 x 520 x 1400
Weight	≈ 130 kg	≈ 140 kg	≈ 155 kg	≈ 200 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

Data subject to change without notice – Edition E

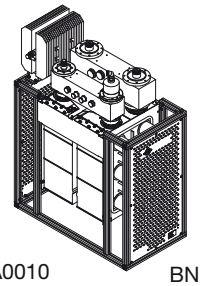
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range

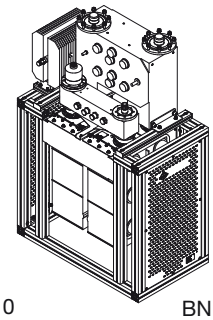




BN 57 49 28 A0010



BN 57 49 67 A0010

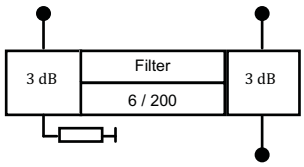


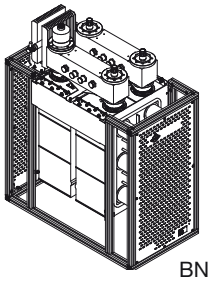
BN 57 49 00 A0020

Part number	**BN 57 49 28 A0010**	**BN 57 49 67 A0010**	**BN 57 49 00 A0020**
Frequency range	470 - 860 MHz		
Channel spacing	≥ 0		
Narrow band input	3 1/8" EIA male		
Filter type integrated cavities/size	**6/200 ≡ BN 616540**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz		
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)	DVB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 10 kW**	**≤ 8 kW**	**≤ 9 kW**
Tuning instruction	AS6194	AS6185	AS6290
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.30 dB ≤ 0.45 dB f_0 ± 3.805 ≤ 0.70 dB ≤ 1.00 dB f_0 ± 3.885 ≤ 0.85 dB ≤ 1.15 dB f_0 ± 4.2 ≥ 4 dB f_0 ± 6 ≥ 20 dB f_0 ± 12 ≥ 40 dB	470 MHz 803 MHz f_0 ≤ 0.4 dB ≤ 0.55 dB f_0 ± 2.79 ≤ 1.0 dB ≤ 1.40 dB f_0 ± 3.0 ≥ 4 dB f_0 ± 3.15 ≥ 8 dB f_0 ± 4.5 ≥ 23 dB f_0 ± 9 ≥ 48 dB f_0 ± 15 ≥ 50 dB	470 MHz 820 MHz f_0 ≤ 0.30 dB ≤ 0.40 dB f_0 ± 3.2 ≤ 0.45 dB ≤ 0.55 dB f_0 ± 4.2 ≥ 13 dB f_0 ± 10.5 ≥ 38 dB
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 500 ns	Δτ ≤ 150 ns
Wide band input	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Average input power	≤ 17.5 kW	≤ 33 kW	≤ 60 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Peak output voltage	≤ 12.5 kV	≤ 15.5 kV	≤ 19.5 kV
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 480 x 1200	900 x 520 x 1400
Weight	≈ 140 kg	≈ 160 kg	≈ 205 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

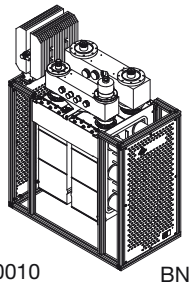
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range
- liquid cooled filter

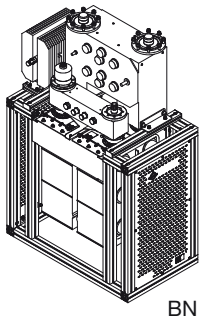




BN 57 46 98 A0010



BN 57 49 71 A0010

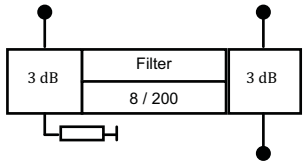


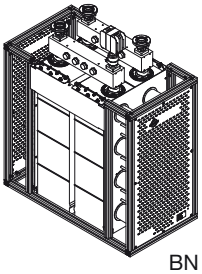
BN 57 49 74 A0020

Part number **Cooling**	**BN 57 46 98 A0010** **liquid cooling**	**BN 57 49 71 A0010** **liquid cooling**	**BN 57 49 74 A0020** **liquid cooling**
Frequency range	470 - 860 MHz		
Channel spacing	≥ 0		
Narrow band input	3 1/8" EIA male		
Filter type integrated cavities/size	**6/200 ≡ BN 616540**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz		
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)	DVB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 23 kW** @ 0 - 1000 m **≤ 20 kW** @ 2000 m **≤ 18 kW** @ 2600 m **≤ 16 kW** @ 3200 m **≤ 14 kW** @ 3800 m **≤ 12 kW** @ 4400 m	**≤ 20 kW** @ 0 - 500 m **≤ 18 kW** @ 1200 m **≤ 16 kW** @ 2000 m **≤ 14 kW** @ 2800 m **≤ 12 kW** @ 3400 m **≤ 10 kW** @ 4200 m	**≤ 22 kW** @ 0 - 600 m **≤ 20 kW** @ 1400 m **≤ 18 kW** @ 2000 m **≤ 16 kW** @ 2600 m **≤ 14 kW** @ 3300 m **≤ 12 kW** @ 4000 m
Tuning instruction	AS6194	AS6185	AS6290
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.30 dB ≤ 0.45 dB $f_0 \pm 3.805$ ≤ 0.70 dB ≤ 1.00 dB $f_0 \pm 3.885$ ≤ 0.85 dB ≤ 1.15 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	470 MHz 803 MHz f_0 ≤ 0.4 dB ≤ 0.55 dB $f_0 \pm 2.79$ ≤ 1.0 dB ≤ 1.40 dB $f_0 \pm 3.0$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB	470 MHz 820 MHz f_0 ≤ 0.30 dB ≤ 0.40 dB $f_0 \pm 3.2$ ≤ 0.45 dB ≤ 0.55 dB $f_0 \pm 4.2$ ≥ 13 dB $f_0 \pm 10.5$ ≥ 38 dB
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 500 ns	Δτ ≤ 150 ns
Wide band input	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Average input power	≤ 17.5 kW	≤ 33 kW	≤ 60 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output Peak output voltage Average output power	3 1/8" EIA male ≤ 12.5 kV ≤ 23.0 kW	4 1/2" EIA male ≤ 15.5 kV –	52-120 BT male ≤ 19.5 kV –
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 480 x 1200	900 x 520 x 1400
Weight	≈ 145 kg	≈ 165 kg	≈ 210 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

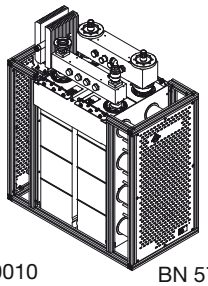
CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range

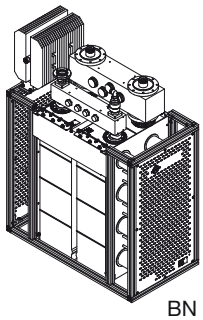




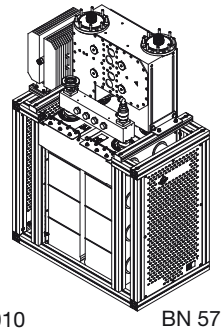
BN 57 49 40 A0010



BN 57 49 39 A0010



BN 57 49 37 A0010



BN 57 49 88 A0020

Part number	**BN 57 49 40 A0010**	**BN 57 49 39 A0010**	**BN 57 49 37 A0010**	**BN 57 49 88 A0020**
Frequency range	470 - 860 MHz			
Channel spacing	≥ 0			
Narrow band input	1 5/8" EIA			
Filter type integrated cavities/size	**8/200 ≡ BN 616544**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz			
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)		ATSC @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 7 kW**	**≤ 6.4 kW**		**≤ 6.4 kW**
Tuning instruction	AS8067	AS8074		AS8066
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.4 dB ≤ 0.5 dB f_0 ± 3.805 ≤ 1.0 dB ≤ 1.4 dB f_0 ± 3.885 ≤ 1.5 dB ≤ 1.7 dB f_0 ± 4.2 ≥ 15 dB f_0 ± 6 ≥ 40 dB f_0 ± 12 ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.45 dB ≤ 0.5 dB f_0 ± 2.79 ≤ 1.20 dB ≤ 1.5 dB f_0 ± 3.15 ≥ 15 dB f_0 ± 4.5 ≥ 30 dB f_0 ± 9 ≥ 55 dB	470 MHz 820 MHz f_0 ≤ 0.5 dB ≤ 0.55 dB f_0 ± 2.69 ≤ 1.0 dB ≤ 1.30 dB f_0 ± 3.0 ≥ 4 dB f_0 ± 3.25 ≥ 18 dB f_0 ± 9 ≥ 64 dB	
Group delay variation	Δτ ≤ 700 ns	Δτ ≤ 500 ns		Δτ ≤ 400 ns
Wide band input	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Average input power	≤ 7 kW	≤ 17.5 kW	≤ 33 kW	≤ 60 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input			
DTV Mask filtering	no			
Insertion loss	≤ 0.1 dB (non adjacent)			
Output	1 5/8" EIA	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Peak output voltage Average output power	≤ 8.5 kV ≤ 7 kW	≤ 12.5 kV –	≤ 15.5 kV –	≤ 19.5 kV –
Isolation between inputs	≥ 35 dB			
VSWR (one WB channel)	≤ 1.06			
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 480 x 1200	900 x 480 x 1200	900 x 520 x 1400
Weight	≈ 160 kg	≈ 170 kg	≈ 185 kg	≈ 230 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

CCS UHF CIB COMBINERS

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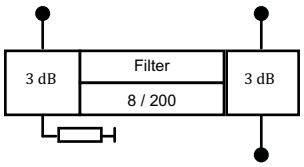
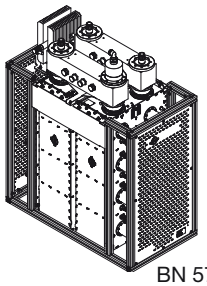
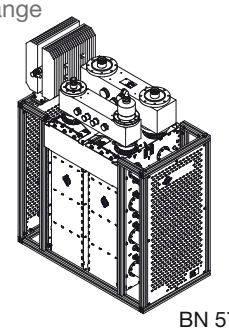
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range

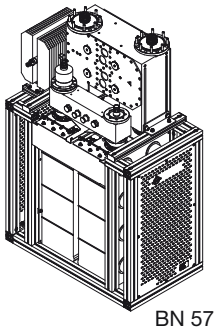




BN 57 49 65 A0010



BN 57 49 66 A0010



BN 57 49 91 A0020

Part number	**BN 57 49 65 A0010**	**BN 57 49 66 A0010**	**BN 57 49 91 A0020**
Frequency range	470 - 860 MHz		
Channel spacing	≥ 0		
Narrow band input	3 1/8“ EIA male		
Filter type integrated cavities/size	**8/200 ≡ BN 616544**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz		
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 7 MHz ($\hat{U}/U_{rms}$=13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power	**≤ 8 kW**	**≤ 6.4 kW**	**≤ 6.4 kW**
Tuning instruction	AS8067	AS8074	AS8066
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.4 dB ≤ 0.5 dB $f_0 \pm 3.805$ ≤ 1.0 dB ≤ 1.4 dB $f_0 \pm 3.885$ ≤ 1.5 dB ≤ 1.7 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.45 dB ≤ 0.5 dB $f_0 \pm 2.79$ ≤ 1.20 dB ≤ 1.5 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9$ ≥ 55 dB	470 MHz 820 MHz f_0 ≤ 0.5 dB ≤ 0.55 dB $f_0 \pm 2.69$ ≤ 1.0 dB ≤ 1.30 dB $f_0 \pm 3.0$ ≥ 4 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB
Group delay variation	Δτ ≤ 700 ns	Δτ ≤ 500 ns	Δτ ≤ 400 ns
Wide band input	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Average input power	≤ 17.5 kW	≤ 33 kW	≤ 60 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Peak output voltage	≤ 12.5 kV	≤ 15.5 kV	≤ 19.5 kV
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 480 x 1200	900 x 520 x 1400
Weight	≈ 175 kg	≈ 190 kg	≈ 240 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

CCS UHF CIB COMBINERS

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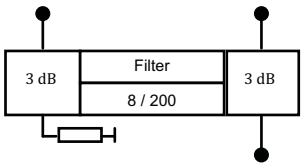
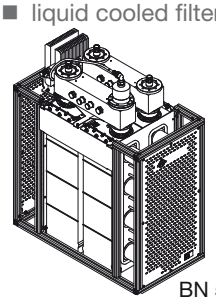
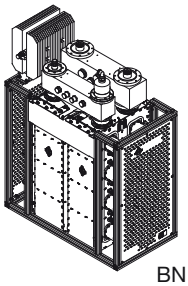
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range
- liquid cooled filter

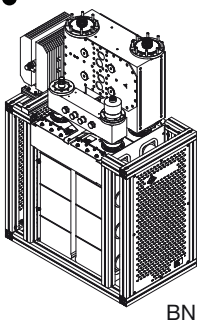




BN 57 49 64 A0010



BN 57 49 89 A0010



BN 57 49 79 A0020

Part number **Cooling**	**BN 57 49 64 A0010** **liquid cooling**	**BN 57 49 89 A0010** **liquid cooling**	**BN 57 49 79 A0020** **liquid cooling**
Frequency range	470 - 860 MHz		
Channel spacing	≥ 0		
Narrow band input	3 1/8" EIA male		
Filter type integrated cavities/size	**8/200 ≡ BN 616544**		
Temperature stability	≤ 2 kHz / K		
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz		
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 23 kW** @ 0 - 1000 m **≤ 20 kW** @ 2000 m **≤ 18 kW** @ 2600 m **≤ 16 kW** @ 3200 m **≤ 14 kW** @ 3800 m **≤ 12 kW** @ 4400 m	**≤ 20 kW** @ 0 - 500 m **≤ 18 kW** @ 1200 m **≤ 16 kW** @ 2000 m **≤ 14 kW** @ 2800 m **≤ 12 kW** @ 3400 m **≤ 10 kW** @ 4200 m	**≤ 22 kW** @ 0 - 600 m **≤ 20 kW** @ 1400 m **≤ 18 kW** @ 2000 m **≤ 16 kW** @ 2600 m **≤ 14 kW** @ 3300 m **≤ 12 kW** @ 4000 m
Tuning instruction	AS8067	AS8074	AS8066
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.4 dB ≤ 0.5 dB $f_0 \pm 3.805$ ≤ 1.0 dB ≤ 1.4 dB $f_0 \pm 3.885$ ≤ 1.5 dB ≤ 1.7 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.45 dB ≤ 0.5 dB $f_0 \pm 2.79$ ≤ 1.20 dB ≤ 1.5 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9$ ≥ 55 dB	470 MHz 820 MHz f_0 ≤ 0.5 dB ≤ 0.55 dB $f_0 \pm 2.69$ ≤ 1.0 dB ≤ 1.30 dB $f_0 \pm 3.0$ ≥ 4 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB
Group delay variation	Δτ ≤ 700 ns	Δτ ≤ 500 ns	Δτ ≤ 400 ns
Wide band input	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Average input power	≤ 17.5 kW	≤ 33 kW	≤ 60 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input		
DTV Mask filtering	no		
Insertion loss	≤ 0.1 dB (non adjacent)		
Output	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male
Peak output voltage	≤ 12.5 kV	≤ 15.5 kV	≤ 19.5 kV
Isolation between inputs	≥ 35 dB		
VSWR (one WB channel)	≤ 1.06		
Dimensions (L x W x H) mm	900 x 480 x 1200	900 x 480 x 1200	900 x 520 x 1400
Weight	≈ 170 kg	≈ 180 kg	≈ 235 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

CCS UHF CIB COMBINERS

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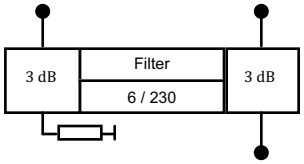
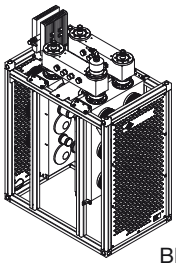
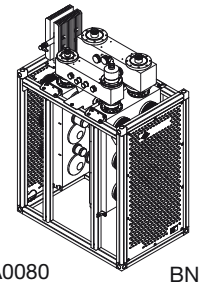
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range





BN 57 55 30 A0080



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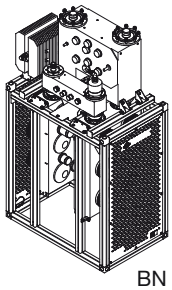

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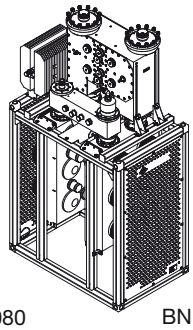

BN 57 55 33 A0080

Part number	**BN 57 55 30 A0080**	**BN 57 55 31 A0080**	**BN 57 55 32 A0080**	**BN 57 55 33 A0080**
Frequency range	470 - 800 MHz			
Channel spacing	≥ 0			
Narrow band input	3 1/8" EIA male			
Filter type integrated cavities/size	**6/230 ≡ BN 616669**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 800 MHz			
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)		ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 17 kW**	**≤ 13.5 kW**		**≤ 13.5 kW**
Tuning instruction	AS6303	AS6365		AS6308
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 786 MHz f_0 ≤ 0.30 dB / ≤ 0.4 dB $f_0 \pm 3.805$ ≤ 0.75 dB / ≤ 0.9 dB $f_0 \pm 3.885$ ≤ 0.85 dB / ≤ 1.0 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	470 MHz / 785 MHz f_0 ≤ 0.4 dB / ≤ 0.55 dB $f_0 \pm 2.79$ ≤ 0.85 dB / ≤ 1.0 dB $f_0 \pm 3.0$ ≥ 2 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB		470 MHz / 785 MHz f_0 ≤ 0.45 dB / ≤ 0.5 dB $f_0 \pm 2.69$ ≤ 0.80 dB / ≤ 0.8 dB $f_0 \pm 3.5$ ≥ 3 dB $f_0 \pm 4$ ≥ 8 dB $f_0 \pm 6$ ≥ 30 dB $f_0 \pm 9$ ≥ 65 dB
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 500 ns		Δτ ≤ 200 ns
Wide band input	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male	6 1/8" EIA male
Average input power	≤ 17.5 kW	≤ 33 kW	≤ 60 kW	≤ 60 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input			
DTV Mask filtering	no			
Insertion loss	≤ 0.1 dB (non adjacent)			
Output	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male	6 1/8" EIA male
Peak output voltage	≤ 12.5 kV	≤ 15.5 kV	≤ 19.5 kV	≤ 24 kV
Isolation between inputs	≥ 35 dB			
VSWR (one WB channel)	≤ 1.06			
Dimensions (L x W x H) mm	900 x 570 x 1400	900 x 570 x 1400	900 x 570 x 1600	900 x 570 x 1650
Weight	≈ 160 kg	≈ 170 kg	≈ 220 kg	≈ 245 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

CCS UHF CIB COMBINERS

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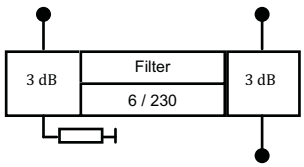
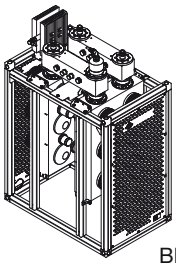
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range
- liquid cooled filters and couplers

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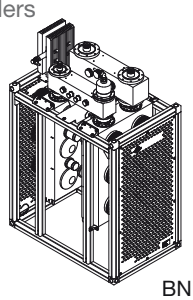
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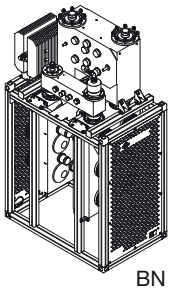
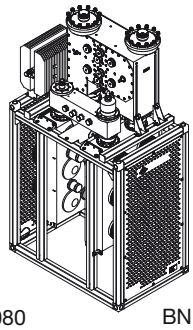
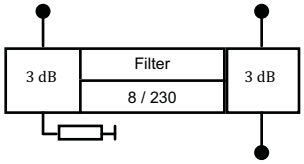

BN 57 55 42 A0080

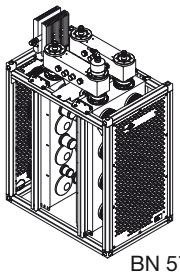

BN 57 55 43 A0080

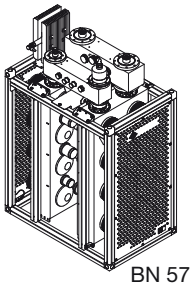
Part number **Cooling**	**BN 57 55 40 A0080** **liquid cooling**	**BN 57 55 41 A0080** **liquid cooling**	**BN 57 55 42 A0080** **liquid cooling**	**BN 57 55 43 A0080** **liquid cooling**
Frequency range	470 - 800 MHz			
Channel spacing	≥ 0			
Narrow band input	3 1/8" EIA male			
Filter type integrated cavities/size	**6/230 ≡ BN 616669**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 800 MHz			
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)		ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 23 kW** @ 0 - 3200 m **≤ 20 kW** @ 3800 m **≤ 18 kW** @ 4200 m	**≤ 23 kW** @ 0 - 2200 m **≤ 20 kW** @ 3000 m **≤ 18 kW** @ 3400 m **≤ 16 kW** @ 4000 m		**≤ 23 kW** @ 0 - 3200 m **≤ 20 kW** @ 3800 m **≤ 18 kW** @ 4200 m
Tuning instruction	AS6303	AS6365		AS6308
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 786 MHz f_0 ≤ 0.30 dB ≤ 0.4 dB $f_0 \pm 3.805$ ≤ 0.75 dB ≤ 0.9 dB $f_0 \pm 3.885$ ≤ 0.85 dB ≤ 1.0 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6$ ≥ 20 dB $f_0 \pm 12$ ≥ 40 dB	470 MHz 785 MHz f_0 ≤ 0.4 dB ≤ 0.45 dB $f_0 \pm 2.79$ ≤0.85 dB ≤ 1.00 dB $f_0 \pm 3.0$ ≥ 2 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9$ ≥ 48 dB $f_0 \pm 15$ ≥ 50 dB	470 MHz 785 MHz f_0 ≤ 0.45 dB ≤ 0.5 dB $f_0 \pm 2.69$ ≤ 0.80 dB ≤ 0.8 dB $f_0 \pm 3.5$ ≥ 3 dB $f_0 \pm 4$ ≥ 8 dB $f_0 \pm 6$ ≥ 30 dB $f_0 \pm 9$ ≥ 65 dB	
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 500 ns		Δτ ≤ 200 ns
Wide band input	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male	6 1/8" EIA male
Average input power	≤ 17.5 kW	≤ 33 kW	≤ 60 kW	≤ 80 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input			
DTV Mask filtering	no			
Insertion loss	≤ 0.1 dB (non adjacent)			
Output Peak output voltage	3 1/8" EIA male ≤ 12.5 kV	4 1/2" EIA male ≤ 15.5 kV	52-120 BT male ≤ 19.5 kV	6 1/8" EIA male ≤ 24 kV
Isolation between inputs	≥ 35 dB			
VSWR (one WB channel)	≤ 1.06			
Dimensions (L x W x H) mm	900 x 570 x 1400	900 x 570 x 1400	900 x 570 x 1600	900 x 570 x 1650
Weight	≈ 160 kg	≈ 170 kg	≈ 220 kg	≈ 245 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range




BN 57 55 35 A0080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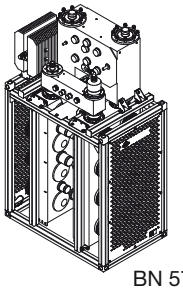
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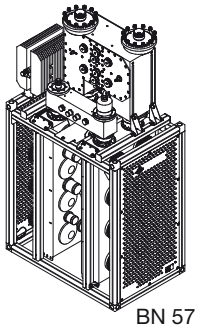
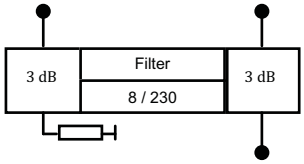

BN 57 55 38 A0080

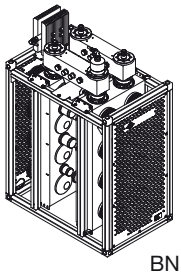
Part number	**BN 57 55 35 A0080**	**BN 57 55 36 A0080**	**BN 57 55 37 A0080**	**BN 57 55 38 A0080**
Frequency range	470 - 800 MHz			
Channel spacing	≥ 0			
Narrow band input	3 1/8" EIA male			
Filter type integrated cavities/size	**8/230 ≡ BN 616670**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz			
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)		ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power	**≤ 17 kW**	**≤ 13.5 kW**		**≤ 13.5 kW**
Tuning instruction	AS8124	AS8128		AS8127
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 790 MHz f_0 ≤ 0.4 dB / ≤ 0.45 dB $f_0 \pm 3.805$ ≤ 1.05 dB / ≤ 1.10 dB $f_0 \pm 3.885$ ≤ 1.25 dB / ≤ 1.35 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6$ ≥ 40 dB $f_0 \pm 12$ ≥ 55 dB	470 MHz / 790 MHz f_0 ≤ 0.45 dB / ≤ 0.50 dB $f_0 \pm 2.79$ ≤ 1.15 dB / ≤ 1.20 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9$ ≥ 55 dB $f_0 \pm 15$ ≥ 65 dB		470 MHz / 790 MHz f_0 ≤ 0.45 dB / ≤ 0.50 dB $f_0 \pm 2.69$ ≤ 1.00 dB / ≤ 1.10 dB $f_0 \pm 3$ ≥ 4 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9$ ≥ 64 dB
Group delay variation	Δτ ≤ 700 ns	Δτ ≤ 550 ns		Δτ ≤ 450 ns
Wide band input	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male	6 1/8" EIA male
Average input power	≤ 17.5 kW	≤ 33 kW	≤ 60 kW	≤ 60 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input			
DTV Mask filtering	no			
Insertion loss	≤ 0.1 dB (non adjacent)			
Output	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male	6 1/8" EIA male
Peak output voltage	≤ 12.5 kV	≤ 15.5 kV	≤ 19.5 kV	≤ 24 kV
Isolation between inputs	≥ 35 dB			
VSWR (one WB channel)	≤ 1.06			
Dimensions (L x W x H) mm	900 x 570 x 1400	900 x 570 x 1400	900 x 570 x 1600	900 x 570 x 1650
Weight	≈ 200 kg	≈ 210 kg	≈ 260 kg	≈ 285 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

Data subject to change without notice – Edition E

CCS UHF CIB COMBINERS

- **CCS** compact design
- integrated mask filters for DTV
- adjacent channel operation
- for 6, 7 and 8 MHz channel bandwidth
- temperature compensated
- tuneable within the whole UHF range
- liquid cooled filters and couplers

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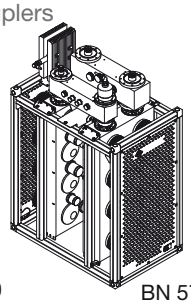
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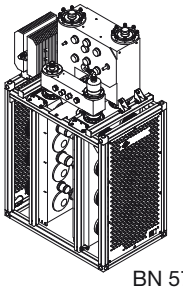
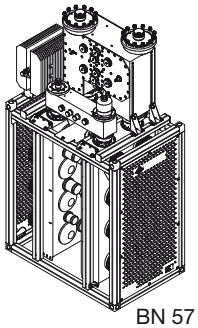

BN 57 55 47 A0080


BN 57 55 48 A0080

Part number **Cooling**	**BN 57 55 45 A0080** **liquid cooling**	**BN 57 55 46 A0080** **liquid cooling**	**BN 57 55 47 A0080** **liquid cooling**	**BN 57 55 48 A0080** **liquid cooling**
Frequency range	470 - 800 MHz			
Channel spacing	≥ 0			
Narrow band input	3 1/8" EIA male			
Filter type integrated cavities/size	**8/230 ≡ BN 616670**			
Temperature stability	≤ 2 kHz / K			
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz			
DTV Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$=13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$=13 dB)		ATSC @ 6 MHz ($\hat{U}/U_{rms}$=11 dB)
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 23 kW** @ 0 -2700 m **≤ 22 kW** @ 3000 m **≤ 20 kW** @ 3400 m **≤ 18 kW** @ 3800 m **≤ 16 kW** @ 4200 m	**≤ 23 kW** @ 0 - 1600 m **≤ 22 kW** @ 1800 m **≤ 20 kW** @ 2400 m **≤ 18 kW** @ 3000 m **≤ 16 kW** @ 3400 m **≤ 14 kW** @ 4000 m		**≤ 23 kW** @ 0 - 1600 m **≤ 22 kW** @ 1800 m **≤ 20 kW** @ 2400 m **≤ 18 kW** @ 3000 m **≤ 16 kW** @ 3400 m **≤ 14 kW** @ 4000 m
Tuning instruction	AS8124	AS8128		AS8127
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 790 MHz f_0 ≤ 0.4 dB ≤ 0.45 dB f_0 ± 3.805 ≤ 1.05 dB ≤ 1.10 dB f_0 ± 3.885 ≤ 1.25 dB ≤ 1.35 dB f_0 ± 4.2 ≥ 15 dB f_0 ± 6 ≥ 40 dB f_0 ± 12 ≥ 55 dB	470 MHz 790 MHz f_0 ≤ 0.45 dB ≤ 0.5 dB f_0 ± 2.79 ≤ 1.15 dB ≤ 1.20 dB f_0 ± 3.15 ≥ 15 dB f_0 ± 4.5 ≥ 30 dB f_0 ± 9 ≥ 55 dB f_0 ± 15 ≥ 65 dB		470 MHz 790 MHz f_0 ≤ 0.45 dB ≤ 0.5 dB f_0 ± 2.69 ≤ 1.00 dB ≤ 1.1 dB f_0 ± 3.0 ≥ 4 dB f_0 ± 3.25 ≥ 18 dB f_0 ± 9 ≥ 64 dB
Group delay variation	Δτ ≤ 700 ns	Δτ ≤ 550 ns		Δτ ≤ 450 ns
Wide band input	3 1/8" EIA male	4 1/2" EIA male	52-120 BT male	6 1/8" EIA male
Average input power	≤ 17.5 kW	≤ 33 kW	≤ 60 kW	≤ 80 kW
	Attention: The power at the wide band input must be reduced by 50 % of the power fed into the narrow band input			
DTV Mask filtering	no			
Insertion loss	≤ 0.1 dB (non adjacent)			
Output Peak output voltage	3 1/8" EIA male ≤ 12.5 kV	4 1/2" EIA male ≤ 15.5 kV	52-120 BT male ≤ 19.5 kV	6 1/8" EIA male ≤ 24 kV
Isolation between inputs	≥ 35 dB			
VSWR (one WB channel)	≤ 1.06			
Dimensions (L x W x H) mm	900 x 570 x 1400	900 x 570 x 1400	900 x 570 x 1600	900 x 570 x 1650
Weight	≈ 200 kg	≈ 210 kg	≈ 260 kg	≈ 285 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

BANDPASS FILTERS

Bandpass and low pass filters are applied between the output of a broadcast transmitter and the antenna to suppress spurious emissions.
For analogue “combined” transmitters the filters must suppress the harmonics of vision and sound carrier.
For DTV transmitters the filters are used to limit the out-of-channel emissions according to the various mask specifications (ATSC, DAB, DVB-T and ISDB-T).

SPINNER offers coaxial filters, dual-mode wave guide filters, dielectric filters and low pass filters for the frequency ranges band 3, UHF and band L for the following applications:

- 8 MHz DVB-T and DVB-T2 extended
- 8 MHz analog TV
- 7 MHz DVB-T and DVB-T2
- 7 MHz analog TV
- 6 MHz DVB-T, DVB-T2, ISDB-T and ATSC
- 6 MHz analogue TV
- 1.54 MHz DAB and T-DMB

In the catalog you can find filter data for the most common applications. However, alternative filter tunings can be made for other mask requirements, applications and bandwidths. Please do not hesitate to contact us.

The filter tuning (pass band and stop band insertion loss, matching and variation of group delay time) is fixed in a tuning specification (e.g. AS6121).
It is mandatory to specify in every order this tuning specification together with the frequency to assure that the filter is tuned in the factory as agreed.

All bandpass filters can be integrated into multi-channel combiners where they simultaneously provide the isolation between transmitters and mask filtering (please see the chapter multi-channel combiners).

The „Environmental Conditions for Broadcast Products“ listed in the annex must be obeyed during operation, transport and storage.
The maximum rating of the filter depends on the environmental conditions like temperature, cooling and height above sea level. The majority of filters can be operated up to 2300 m above sea level with the power specified in the data sheet. For stations at higher altitude the power has to be reduced as shown in the „Environmental Conditions for Broadcast Products”.
For some filters with liquid cooling the derating has to be applied above 500 m as shown in the data sheets.
The input and output ports of all bandpass filters end inside the resonators with an open or a short. So these filters block DC and low frequencies.

Most bandpass filters are equipped with cross couplings to achieve steeper slopes for mask filtering. Inside multi-channel combiners the cross couplings are used to enable adjacent channels operation.

VHF / BAND 3, COAXIAL BANDPASS FILTER

Part number	Frequency in MHz	Average input power	Typ. application	Number / Size of cavities
BN 61 63 65	167 - 254	≤ 2.7 kW	ATV	4/150
BN 61 63 64	167 - 254	≤ 7.1 kW	ATV	4/150
BN 61 71 15	223 - 240	≤ 300 W	DAB/T-DMB	6/170
BN 61 71 16	174 - 240	≤ 500 W	DAB/T-DMB	6/100
BN 61 71 71	170 - 240	≤ 1.5 kW	DAB/T-DMB	6/150
BN 61 71 44	170 - 240	≤ 1.6 kW	DAB/T-DMB	6/150
BN 61 71 45	215 - 240	≤ 1.6 kW	DAB/T-DMB	6/150
BN 61 71 83	170 - 240	≤ 1.6 kW	DAB/T-DMB	8/150
BN 61 71 11	170 - 240	≤ 3.0 kW	DAB/T-DMB	6/200
BN 61 71 10	170 - 240	≤ 5.1 kW	DAB/T-DMB	6/200
BN 61 71 08	170 - 240	≤ 3.0 kW	DAB/T-DMB	6/200
BN 61 71 09	170 - 240	≤ 5.1 kW	DAB/T-DMB	6/200
BN 61 71 13	170 - 240	≤ 3.1 kW	DAB/T-DMB	8/200
BN 61 71 12	170 - 240	≤ 5.1 kW	DAB/T-DMB	8/200
BN 61 71 90	174 - 230	≤ 1.1 kW	DTV	6/100
BN 61 71 26	174 - 230	≤ 4.0 kW	DTV	6/150
BN 61 71 91	174 - 230	≤ 3.5 kW	DTV	8/150
BN 61 71 93	174 - 230	≤ 3.5 kW	DTV	10/150

UHF COAXIAL BANDPASS FILTER

Part number	Frequency in MHz	Average input power 6 MHz	8 MHz	Typ. application	Number / Size of cavities
BN 61 65 07	470 - 860	≤ 40 W	≤ 50 W	DTV/ATV	4/34
BN 61 65 01	470 - 860	≤ 100 W	≤ 100 W	DTV	6/38
BN 61 66 60	470 - 860	≤ 100 W	≤ 130 W	DTV	6/40
BN 61 66 61	470 - 860	≤ 100 W	≤ 130 W	DTV	8/40
BN 61 65 66	470 - 860	≤ 300 W	≤ 375 W	DTV	6/60
BN 61 65 68	470 - 860	≤ 300 W	≤ 375 W	DTV	8/60
BN 61 64 02	470 - 860	≤ 600 W	≤ 750 W	DTV	6/84
BN 61 64 03	470 - 860	≤ 600 W	≤ 750 W	DTV	8/84
BN 61 66 63	470 - 860	≤ 1.3 kW	≤ 1.6 kW	DTV	6/120
BN 61 66 64	470 - 860	≤ 1.3 kW	≤ 1.6 kW	DTV	8/120
BN 61 64 04	470 - 860	≤ 5.0 kW	≤ 5.0 kW	ATV	4/150
BN 61 65 72	470 - 803	≤ 2.25 kW	–	ATSC	6/150
BN 61 65 18	470 - 860	≤ 2.0 kW	≤ 2.5 kW	DTV	6/150
BN 61 65 42	470 - 860	≤ 1.6 kW	≤ 2.0 kW	DTV	8/150
BN 61 66 65	470 - 860	≤ 3.0 kW	≤ 3.75 kW	DTV	6/170
BN 61 66 65	470 - 860	≤ 6.0 kW	≤ 7.5 kW	DTV	6/170

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UHF COAXIAL BANDPASS FILTER

Part number	Frequency in MHz	Average input power 6 MHz	8 MHz	Typ. application	Number / Size of cavities
BN 61 66 66	470 - 860	≤ 3.0 kW	≤ 3.75 kW	DTV	8/170
BN 61 66 66	470 - 860	≤ 5.0 kW	≤ 6.25 kW	DTV	8/170
BN 61 64 09	470 - 860	≤ 6.0 kW	≤ 7.5 kW	ATV	4/200
BN 61 64 09	470 - 860	≤ 11.2 kW	≤ 14 kW	ATV	4/200
BN 61 65 71	470 - 803	≤ 4.5 kW	–	ATSC	6/200
BN 61 65 70	470 - 803	≤ 10.0 kW	–	ATSC	6/200
BN 61 65 40	470 - 860	≤ 4.0 kW	≤ 5.0 kW	DTV	6/200
BN 61 65 50	470 - 860	≤ 10.0 kW	≤ 12.5 kW	DTV	6/200
BN 61 65 44	470 - 860	≤ 3.2 kW	≤ 4.0 kW	DTV	8/200
BN 61 65 54	470 - 860	≤ 10.0 kW	≤ 12.5 kW	DTV	8/200
BN 61 66 69	470 - 790	≤ 6.75 kW	≤ 18.0 kW	DTV	6/230
BN 61 66 70	470 - 790	≤ 6.75 kW	≤ 16.5 kW	DTV	8/230

BAND L BANDPASS FILTERS WITH DUAL MODE WAVE GUIDE RESONATORS

Part number	Frequency in MHz	Average input power	Typ. application	Number / Size of cavities
BN 61 65 11 **BN 61 65 12**	1452 - 1468 1468 - 1492	≤ 1.2 kW	DAB / T-DMB	4/DM
BN 61 65 13 **BN 61 65 14**	1452 - 1468 1468 - 1492	≤ 1.6 kW	DAB / T-DMB	4/DM

BAND L BANDPASS FILTERS WITH DIELECTRIC RESONATORS

Part number	Frequency in MHz	Average input power	Typ. application	Number / Size of cavities
BN 61 65 16	1452 - 1492	≤ 400 W	DAB / T-DMB	4/DE

UHF LOW-PASS FILTERS

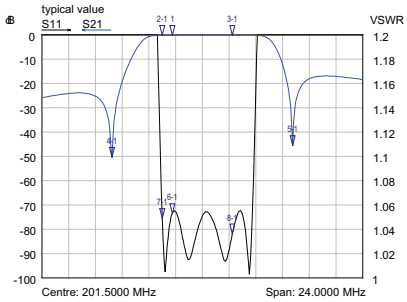
Part number	Frequency in MHz	Average input power	Typ. application	Design
BN 61 63 95	330 - 960	≤ 1.0 kW	DTV / ATV	coaxial
BN 61 64 52	470 - 862	≤ 2.0 kW	DTV / ATV	SWS

ANNEX

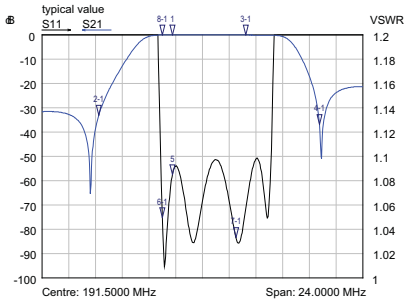
Accessories for Liquid Cooling	

2.7 KW - 7.1 KW BAND 3 ATV BANDPASS FILTER

- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within band 3
- temperature compensated
- DC block
- installation horizontally or vertically



Typical diagram AS4013



Typical diagram AS4010

Part number **Connectors**	**BN 61 63 65** **7-16 female**	**BN 61 63 64** **1 5/8" EIA**
Frequency range	167 - 254 MHz	
Number / Size of cavities	**4 / 150**	
Mask filtering	ATV	ATV
Average input power	**≤ 2.7 kW ≡ 3.5/0.35 kW BN 61 63 65** **≤ 7.1 kW ≡ 10.0/1.0 kW BN 61 63 64**	**≤ 2.7 kW ≡ 3.5/0.35 kW BN 61 63 65** **≤ 7.1 kW ≡ 10.0/1.0 kW BN 61 63 64**
Tuning instruction	Standard D: AS4027 Standard I: AS4019	Standard M: AS4013 Standard B: AS4010
Insertion loss & Mask filtering (alternative tuning on request)	$f_{(V)} - \Delta$ > 30.0 dB $f_{(V) - 0.75\ MHz}$ ≤ 0.20 dB $f_{(V)}$ ≤ 0.20 dB $f_{(S)} = f_{(V)} + \Delta$ ≤ 0.20 dB $f_{(V)} + 2\Delta$ > 30.0 dB	$f_{(V)} - \Delta$ > 30.0 dB $f_{(V) - 0.75\ MHz}$ ≤ 0.25 dB $f_{(V)}$ ≤ 0.25 dB $f_{(S)} = f_{(V)} + \Delta$ ≤ 0.25 dB $f_{(V)} + 2\Delta$ > 30.0 dB
VSWR (pass band range)	$f_{(V) - 0.75\ MHz}$ ≤ 1.15 $f_{(V)}$ ≤ 1.10 $f_{(S)} = f_{(V)} + \Delta$ ≤ 1.10	$f_{(V) - 0.75\ MHz}$ ≤ 1.15 $f_{(V)}$ ≤ 1.10 $f_{(S)} = f_{(V)} + \Delta$ ≤ 1.10
Group delay variation	$\Delta\tau \leq 30$ ns	$\Delta\tau \leq 30$ ns
Temperature stability	≤ 2 kHz / K	
Connectors	7-16 female	1 5/8" EIA
Dimensions (L x W x H) mm	323 x 295 x 745	408 x 347 x 762
Weight	ca. 38 kg	ca. 38 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

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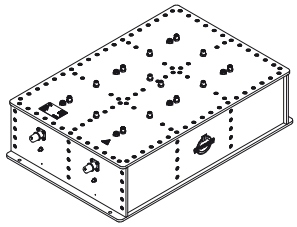
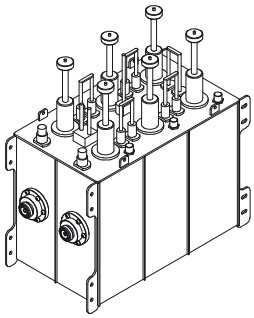
300 W - 500 W BAND 3 DAB / T-DMB BANDPASS FILTER

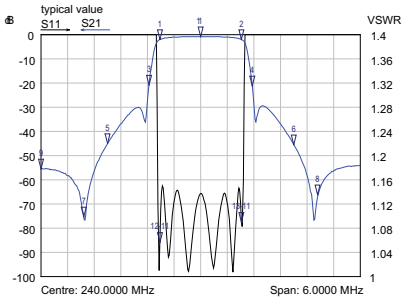
- mask filter for DAB and T-DMB
- for 1.54 MHz block bandwidth
- with cross coupling (notch function)
- tuneable within band 3 (BN 617115 with tuning kits)
- temperature compensated
- DC block
- installation horizontally or vertically



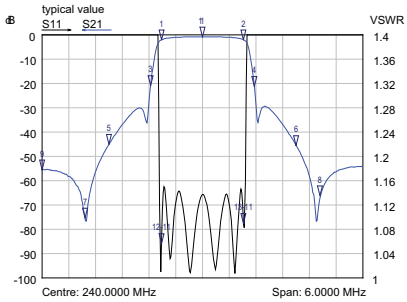
BN 61 71 15 C1015



BN 61 71 16 C1025



Typical diagram AS6353

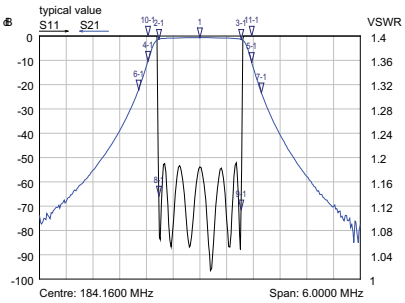


Typical diagram AS6033

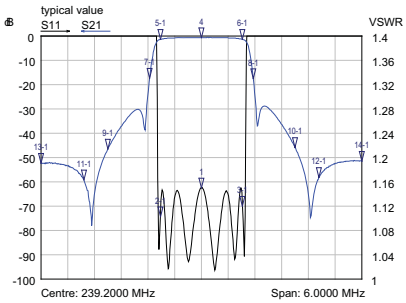
Part number	**BN 61 71 15 C1015**	**BN 61 71 16 C1025**
Frequency range	223 - 240 MHz	174 - 240 MHz
Number / Size of cavities	**6 / 170**	**6 / 100**
Harmonics attenuation	≥ 60 dB for f ≤ 720 MHz	≥ 50 dB for f ≤ 500 MHz
Mask filtering	DAB / T-DMB @1.54 MHz ($\hat{U}/U_{rms}$ = 13 dB)	
Average input power	**≤ 300 W**	**≤ 600 W**
Tuning instruction	AS6353	AS6033
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.9 dB $f_0 \pm 0.77$ ≤ 2.2 dB $f_0 \pm 0.97$ ≥ 15 dB $f_0 \pm 1.75$ ≥ 45 dB $f_0 \pm 2.20$ ≥ 50 dB $f_0 \pm 3.00$ ≥ 50 dB	f_0 ≤ 0.9 dB $f_0 \pm 0.77$ ≤ 2.2 dB $f_0 \pm 0.97$ ≥ 15 dB $f_0 \pm 1.75$ ≥ 45 dB $f_0 \pm 2.20$ ≥ 53 dB $f_0 \pm 3.00$ ≥ 53 dB
VSWR (pass band range)	≤ 1.15	≤ 1.15
Group delay variation	$\Delta\tau \leq 1200$ ns	$\Delta\tau \leq 1200$ ns
Temperature stability	≤ 1 kHz / K	≤ 1 kHz / K
Connectors	N female	7-16 female
Dimensions (L x W x H) mm	581 x 378 x 178	416 x 214 x 442
Weight	ca. 25 kg	ca. 25 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

1.5 KW - 1.6 KW BAND 3 DAB / T-DMB BANDPASS FILTER

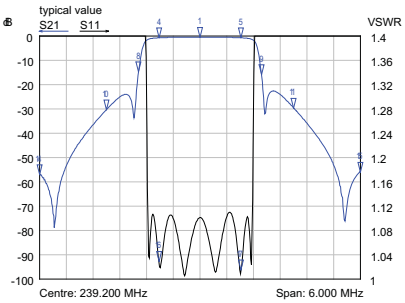
- mask filter for DAB and T-DMB
- for 1.54 MHz block bandwidth
- tuneable within band 3
- temperature compensated
- DC block
- installation standing



Typical diagram AS6010



Typical diagram AS6137

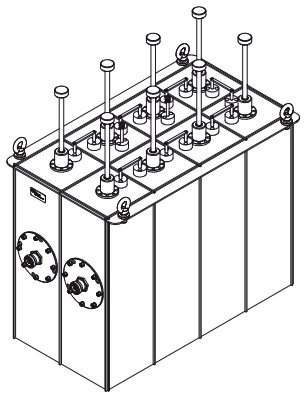


Typical diagram AS6149

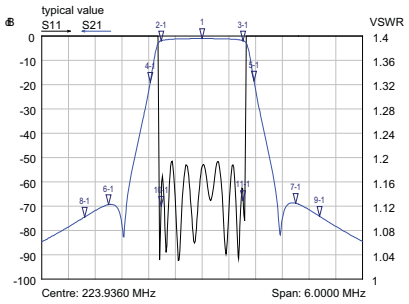
Part number **Filter design**	**BN 61 71 71** **without cross coupling**	**BN 61 71 44** **with cross coupling**	**BN 61 71 45** **with cross coupling**
Frequency range	170 - 240 MHz		215 - 240 MHz
Number / Size of cavities	**6 / 150**		
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz		
Mask filtering	DAB / T-DMB @1.54 MHz ($\hat{U}/U_{rms}$ = 13 dB)		
Average input power	**≤ 1.5 kW**	**≤ 1.6 kW**	**≤ 1.6 kW**
Tuning instruction	AS6010	AS6137	AS 6149
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.9 dB f_0 ± 0.77 ≤ 1.5 dB f_0 ± 0.97 ≥ 8.0 dB f_0 ± 1.75 ≥ 43.0 dB f_0 ± 2.20 ≥ 53.0 dB f_0 ± 3.00 ≥ 73.0 dB	f_0 ≤ 0.65 dB f_0 ± 0.77 ≤ 1.50 dB f_0 ± 0.97 ≥ 15.0 dB f_0 ± 1.75 ≥ 45.0 dB f_0 ± 2.20 ≥ 58.0 dB f_0 ± 3.00 ≥ 50.0 dB	f_0 ≤ 0.55 dB f_0 ± 0.77 ≤ 0.80 dB f_0 ± 0.97 n.d. f_0 ± 1.75 ≥ 15.0 dB f_0 ± 2.20 ≥ 40.0 dB f_0 ± 3.00 ≥ 50.0 dB
VSWR (pass band range)	≤ 1.22	≤ 1.15	≤ 1.15
Group delay variation	Δτ ≤ 700 ns	Δτ ≤ 1000 ns	Δτ ≤ 400 ns
Temperature stability	≤ 1 kHz / K		
Connectors	7-16 female		
Dimensions (L x W x H) mm	465 x 326 x 680	461 x 326 x 680	495 x 325 x 476
Weight	ca. 40 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

Data subject to change without notice – Edition E

1.6 KW BAND 3 DAB / T-DMB BANDPASS FILTERS



- mask filter for DAB and T-DMB
- for 1.54 MHz block bandwidth
- with cross coupling (notch function)
- tuneable within band 3
- temperature compensated
- DC block
- installation standing

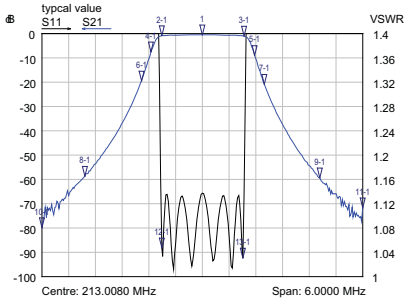


Typical diagram AS8027

Part number	**BN 61 71 83**
Frequency range	170 - 240 MHz
Number / Size of cavities	**8 / 150**
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz
Mask filtering	DAB / T-DMB @1.54 MHz ($\hat{U}/U_{rms}$ = 13 dB)
Average input power	**≤ 1.6 kW**
Tuning instruction	AS8027
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 1.20 dB $f_0 \pm 0.77$ ≤ 2.10 dB $f_0 \pm 0.97$ ≥ 15.0 dB $f_0 \pm 1.75$ ≥ 45.0 dB $f_0 \pm 2.20$ ≥ 65.0 dB $f_0 \pm 3.00$ ≥ 80.0 dB
VSWR (pass band range)	≤ 1.2
Group delay variation	$\Delta\tau \leq 1000$ ns
Temperature stability	≤ 1 kHz / K
Connectors	7-16 female
Dimensions (L x W x H) mm	615 x 347 x 680
Weight	ca. 60 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“

3 KW - 5.1 KW BAND 3 DAB / T-DMB BANDPASS FILTERS

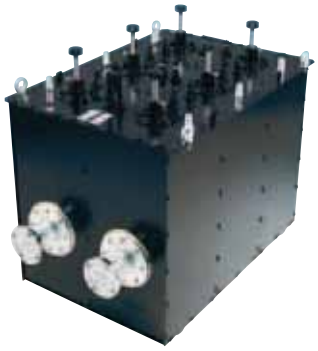
- mask filter for DAB and T-DMB
- for 1.54 MHz block bandwidth
- without cross coupling (notch function)
- tuneable within band 3
- temperature compensated
- DC block
- installation standing
- natural or liquid cooling



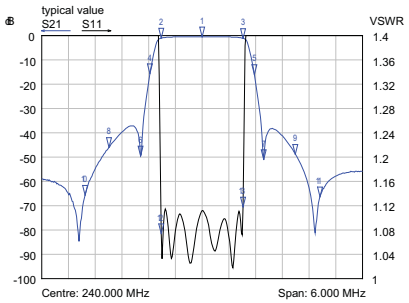
Typical diagram AS6029

Part number **Cooling**	**BN 61 71 11** **natural cooling**	**BN 61 71 10** **liquid cooling**
Frequency range	170 - 240 MHz	
Number / Size of cavities	**6 / 200**	
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz	
Mask filtering	DAB / T-DMB @1.54 MHz ($\hat{U}/U_{rms}$ = 13 dB)	
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 3.0 kW**	**≤ 5.1 kW @ 0 - 500 m** **≤ 4.5 kW @ 1400 m** **≤ 4.0 kW @ 2100 m** **≤ 3.5 kW @ 2800 m** **≤ 3.0 kW @ 3600 m**
Tuning instruction	AS6029	
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.65 dB $f_0 \pm 0.77$ ≤ 1.10 dB $f_0 \pm 0.97$ ≥ 8.00 dB $f_0 \pm 1.15$ ≥ 16.0 dB $f_0 \pm 1.75$ ≥ 43.0 dB $f_0 \pm 2.20$ ≥ 53.0 dB $f_0 \pm 3.00$ ≥ 73.0 dB	
VSWR (pass band range)	≤ 1.15	
Group delay variation	Δτ ≤ 800 ns	
Temperature stability	≤ 2 kHz / K	
Connectors	1 5/8" EIA	
Dimensions (L x W x H) mm	710 x 450 x 680	
Weight	ca. 82 kg	
Coolant / Flow rate	–	mix: glycol and water BN 15 45 67 / ≥ 3 l/min
Temperature of the coolant	–	20 °C - 60 °C
Cooling interface	–	for hose with inner width 3/4"
Material of cooling	–	stainless steel
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

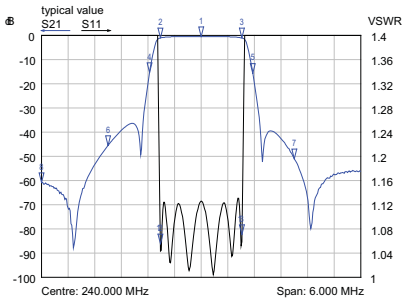
3 KW - 5.1 KW BAND 3 DAB / T-DMB BANDPASS FILTERS



- mask filter for DAB and T-DMB
- for 1.54 MHz block bandwidth
- with cross coupling (notch function)
- tuneable within band 3
- temperature compensated
- DC block
- installation standing
- natural or liquid cooling



Typical diagram AS6019

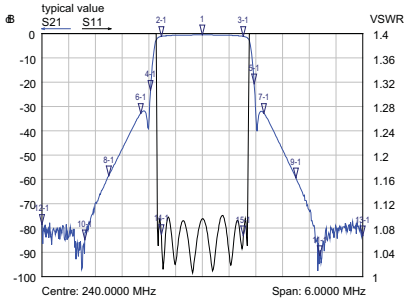


Typical diagram AS6087

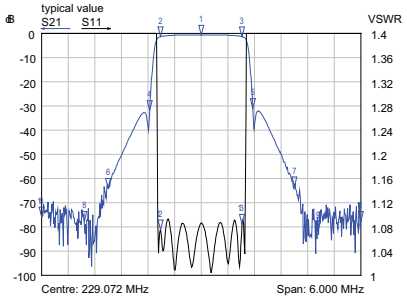
Part number **Cooling**	**BN 61 71 08** **natural cooling**	**BN 61 71 09** **liquid cooling**
Frequency range	170 - 240 MHz	
Number / Size of cavities	**6 / 200**	
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz	
Mask filtering	DAB / T-DMB @1.54 MHz ($\hat{U}/U_{rms}$ = 13 dB)	
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 3.0 kW**	**≤ 5.1 kW @ 0 - 500 m** **≤ 4.5 kW @ 1400 m** **≤ 4.0 kW @ 2100 m** **≤ 3.5 kW @ 2800 m** **≤ 3.0 kW @ 3600 m**
Tuning instruction	AS6019	AS6087
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.55 dB f_0 ± 0.77 ≤ 1.20 dB f_0 ± 0.97 ≥ 12.0 dB f_0 ± 1.15 ≥ 30.0 dB f_0 ± 1.75 ≥ 40.0 dB f_0 ± 2.20 ≥ 55.0 dB f_0 ± 3.00 ≥ 55.0 dB	f_0 ≤ 0.50 dB f_0 ± 0.77 ≤ 1.30 dB f_0 ± 0.97 ≥ 15.0 dB f_0 ± 1.15 n.d. f_0 ± 1.75 ≥ 45.0 dB f_0 ± 2.20 ≥ 50.0 dB f_0 ± 3.00 ≥ 50.0 dB
VSWR (pass band range)	≤ 1.15	≤ 1.15
Group delay variation	Δτ ≤ 1000 ns	Δτ ≤ 1200 ns
Temperature stability	≤ 2 kHz / K	
Connectors	1 5/8" EIA	
Dimensions (L x W x H) mm	710 x 450 x 680	
Weight	ca. 82 kg	
Coolant / Flow rate	–	mix: glycol and water BN 15 45 67 / ≥ 3 l/min
Temperature of the coolant	–	20 °C - 60 °C
Cooling interface	–	for hose with inner width 3/4"
Material of cooling	–	stainless steel
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

3 KW - 5.1 KW BAND 3 DAB / T-DMB BANDPASS FILTERS

- mask filter for DAB and T-DMB
- for 1.54 MHz block bandwidth
- with cross coupling (notch function)
- tuneable within band 3
- temperature compensated
- DC block
- installation standing
- natural or liquid cooling



Typical diagram AS8042



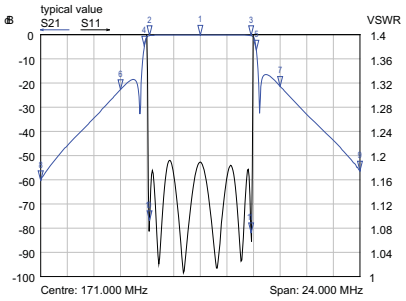
Typical diagram AS8075

Part number **Cooling**	**BN 61 71 13** **natural cooling**	**BN 61 71 12** **liquid cooling**
Frequency range	170 - 240 MHz	
Number / Size of cavities	**8 / 200**	
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz	
Mask filtering	DAB / T-DMB @1.54 MHz ($\hat{U}/U_{rms}$ = 13 dB)	
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 3.1 kW**	**≤ 5.1 kW @ 0 - 500 m** **≤ 4.5 kW @ 1400 m** **≤ 4.0 kW @ 2100 m** **≤ 3.5 kW @ 2800 m** **≤ 3.0 kW @ 3600 m**
Tuning instruction	AS8042	AS8075
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.60 dB f_0 ± 0.77 ≤ 1.20 dB f_0 ± 0.97 ≥ 15.0 dB f_0 ± 1.15 ≥ 30.0 dB f_0 ± 1.75 ≥ 50.0 dB f_0 ± 2.20 ≥ 65.0 dB f_0 ± 3.00 ≥ 65.0 dB	f_0 ≤ 0.65 dB f_0 ± 0.77 ≤ 1.45 dB f_0 ± 0.97 ≥ 28.0 dB f_0 ± 1.15 n.d. f_0 ± 1.75 ≥ 61.0 dB f_0 ± 2.20 ≥ 67.0 dB f_0 ± 3.00 ≥ 70.0 dB
VSWR (pass band range)	≤ 1.10	≤ 1.10
Group delay variation	Δτ ≤ 1200 ns	Δτ ≤ 1300 ns
Temperature stability	≤ 2 kHz / K	
Connectors	1 5/8" EIA	
Dimensions (L x W x H) mm	882 x 450 x 678	
Weight	ca. 105 kg	
Coolant / Flow rate	–	mix: glycol and water BN 15 45 67 / ≥ 3 l/min
Temperature of the coolant	–	20 °C - 60 °C
Cooling interface	–	for hose with inner width 3/4"
Material of cooling	–	stainless steel
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

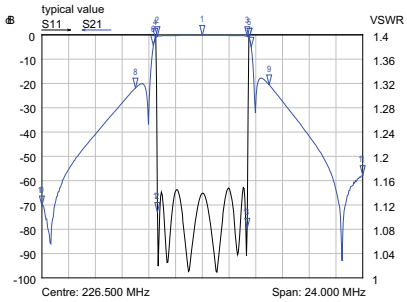
Data subject to change without notice – Edition E

900 W - 1100 W BAND 3 DTV BANDPASS FILTER

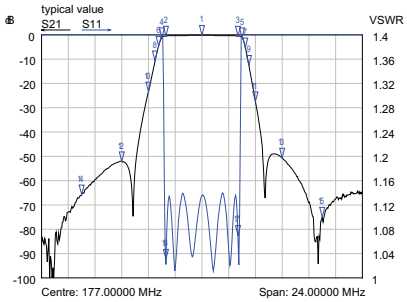
- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within band 3
- temperature compensated
- DC block
- installation standing



Typical diagram AS6164



Typical diagram AS6162

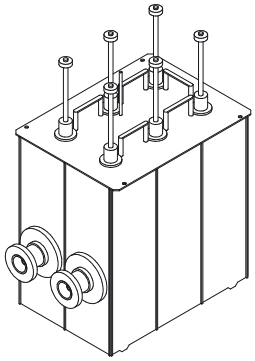


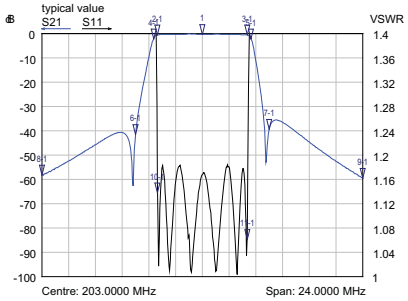
Typical diagram AS6161

Part number	**BN 61 71 90 C0010**		
Frequency range	174 - 230 MHz		
Number / Size of cavities	**6 / 100**		
Harmonics attenuation	≥ 50 dB for f ≤ 500 MHz		
Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	DVB-T @ 7 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power	**≤ 1.1 kW**	**≤ 1.0 kW**	**≤ 900 W**
Tuning instruction	AS6164	AS6162	AS6161
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.25 dB f_0 ± 0.3805 ≤ 0.65 dB f_0 ± 4.20 ≥ 4.00 dB f_0 ± 6.00 ≥ 20.0 dB f_0 ± 12.0 ≥ 55.0 dB	f_0 ≤ 0.25 dB f_0 ± 3.35 ≤ 0.70 dB f_0 ± 3.50 ≥ 1.20 dB f_0 ± 3.65 ≥ 4.00 dB f_0 ± 5.00 ≥ 20.0 dB f_0 ± 12.0 ≥ 55.0 dB	f_0 ≤ 0.30 dB f_0 ± 2.69 ≤ 0.50 dB f_0 ± 3.00 ≥ 1.10 dB f_0 ± 3.50 ≥ 8.00 dB f_0 ± 4.00 ≥ 15.0 dB f_0 ± 6.00 ≥ 30.0 dB f_0 ± 9.00 ≥ 64.0 dB
VSWR (pass band range)	≤ 1.22	≤ 1.17	≤ 1.15
Group delay variation	$\Delta\tau$ ≤ 350 ns	$\Delta\tau$ ≤ 350 ns	$\Delta\tau$ ≤ 220 ns
Temperature stability	≤ 2 kHz / K		
Connectors	7-16 female		
Dimensions (L x W x H) mm	382 x 244 x 590		
Weight	ca. 25 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

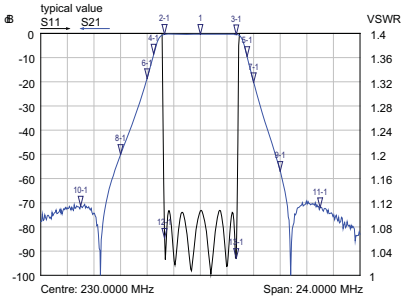
2.5 KW - 4 KW BAND 3 DTV BANDPASS FILTERS

- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within band 3
- temperature compensated
- DC block
- installation standing





Typical diagram AS6044



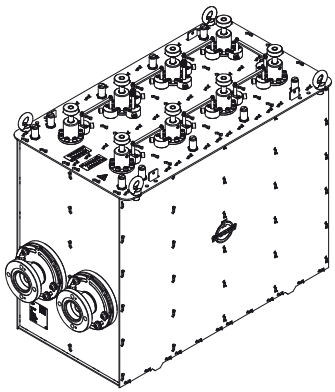
Typical diagram AS6079

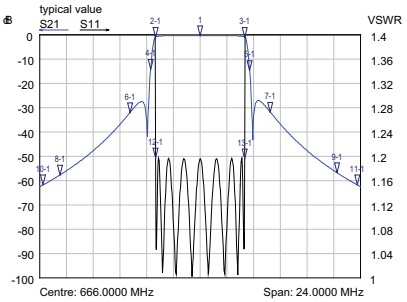
Part number **Connectors**	**BN 61 71 26** **7-16 female**	**BN 61 71 26 C0010** **1 5/8" EIA**
Frequency range	174 - 230 MHz	
Number / Size of cavities	**6 / 150**	
Mask filtering	DVB-T @7 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power	**≤ 2.5 kW BN 61 71 26** **≤ 4.0 kW BN 61 71 26 C0010**	**≤ 2.5 kW BN 61 71 26** **≤ 3.6 kW BN 61 71 26 C0010**
Tuning instruction	AS6044	AS6079
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.30 dB $f_0 \pm 3.35$ ≤ 0.60 dB $f_0 \pm 3.50$ ≥ 0.70 dB $f_0 \pm 3.65$ ≥ 2.00 dB $f_0 \pm 5.00$ ≥ 35.0 dB $f_0 \pm 12.0$ ≥ 55.0 dB	f_0 ≤ 0.35 dB $f_0 \pm 2.69$ ≤ 0.60 dB $f_0 \pm 3.00$ ≥ 1.30 dB $f_0 \pm 3.50$ ≥ 5.00 dB $f_0 \pm 4.00$ ≥ 11.0 dB $f_0 \pm 6.00$ ≥ 30.0 dB $f_0 \pm 9.00$ ≥ 65.0 dB
VSWR (pass band range)	≤ 1.20	≤ 1.15
Group delay variation	$\Delta\tau \leq 300$ ns	$\Delta\tau \leq 200$ ns
Temperature stability	≤ 2 kHz / K	
Connectors	7-16 female	1 5/8" EIA
Dimensions (L x W x H) mm	461 x 326 x 681	512 x 326 x 684
Weight	ca. 42 kg	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

Data subject to change without notice – Edition E

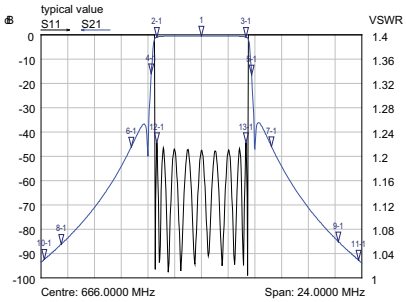
3.5 KW BAND 3 DTV BANDPASS FILTERS

- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within band 3
- temperature compensated
- DC block
- installation standing





Typical diagram AS8049

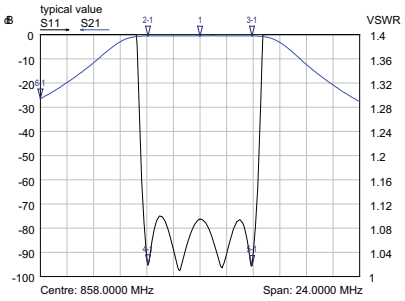


Typical diagram AS1001

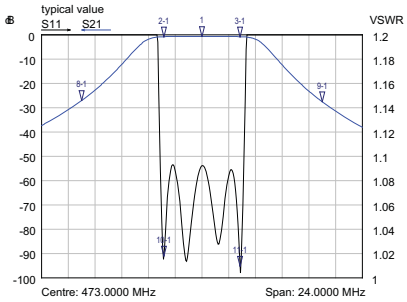
Part number **Cavities**	**BN 61 71 91** **8 cavities**	**BN 61 71 93** **10 cavities**
Frequency range	174 - 230 MHz	
Number / Size of cavities	**8 / 150**	**10 / 150**
Mask filtering	DVB-T @7 MHz ($\hat{U}/U_{rms}$ = 13 dB)	DVB-T @7 MHz ($\hat{U}/U_{rms}$ = 13 dB)
Average input power	**≤ 3.5 kW**	**≤ 3.5 kW**
Tuning instruction	AS8049	AS1001
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.35 dB $f_0 \pm 3.35$ ≤ 0.85 dB $f_0 \pm 3.70$ ≥ 15.0 dB $f_0 \pm 5.25$ ≥ 30.0 dB $f_0 \pm 10.50$ ≥ 50.0 dB $f_0 \pm 11.75$ ≥ 55.0 dB	f_0 ≤ 0.50 dB $f_0 \pm 3.35$ ≤ 1.60 dB $f_0 \pm 3.70$ ≥ 15.0 dB $f_0 \pm 5.25$ ≥ 40.0 dB $f_0 \pm 10.50$ ≥ 65.0 dB $f_0 \pm 11.75$ ≥ 70.0 dB
VSWR (pass band range)	≤ 1.20	≤ 1.22
Group delay variation	$\Delta\tau \leq 600$ ns	$\Delta\tau \leq 800$ ns
Temperature stability	≤ 2 kHz / K	
Connectors	1 5/8" EIA	
Dimensions (L x W x H) mm	650 x 326 x 680	804 x 348 x 683
Weight	ca. 68 kg	ca. 89 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

40 W - 50 W UHF DTV BANDPASS FILTERS

- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- without cross coupling
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically



Typical diagram AS4054



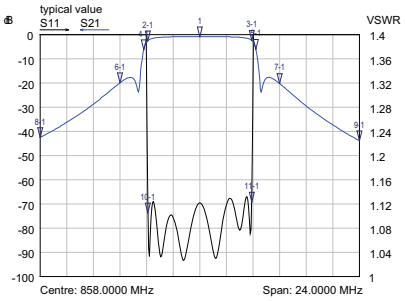
Typical diagram AS4029

Part number	**BN 61 65 07**	
Frequency range	470 - 860 MHz	
Number / Size of cavities	**4 / 34**	
Harmonics attenuation	≥ 50 dB for f ≤ 1500 MHz	
TV standard	DVB-T or ATV @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	DVB-T or ATV @6 MHz ($\hat{U}/U_{rms}$ = 13 dB)
Average input power	**≤ 50 W**	**≤ 40 W**
Tuning instruction	AS4054	AS4029
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.7 dB ≤ 0.6 dB $f_0 \pm 3.805$ ≤ 0.8 dB ≤ 0.7 dB $f_0 \pm 3.885$ ≤ 0.8 dB ≤ 0.7 dB $f_0 \pm 12.0$ ≥ 17 dB	470 MHz 803 MHz f_0 ≤ 0.8 dB ≤ 0.7 dB $f_0 \pm 2.855$ ≤ 0.9 dB ≤ 0.8 dB $f_0 \pm 9.0$ ≥ 25 dB
VSWR (pass band range)	≤ 1.10	≤ 1.10
Group delay variation	$\Delta\tau \leq 100$ ns	$\Delta\tau \leq 30$ ns
Temperature stability	≤ 10 kHz / K	
Connectors	N female	
Dimensions (L x W x H) mm	277 x 44 x 135	
Weight	ca. 2 kg	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

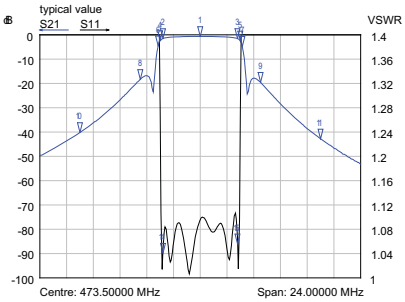
Data subject to change without notice – Edition E

100 W UHF DTV BANDPASS FILTERS

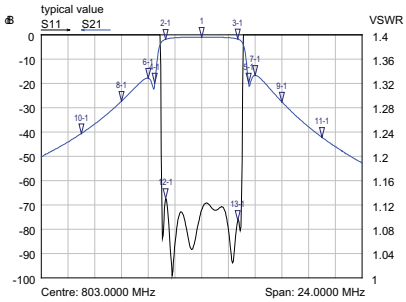
- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically



Typical diagram AS6214



Typical diagram AS6180

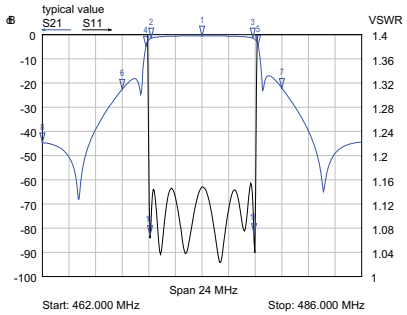


Typical diagram AS6074

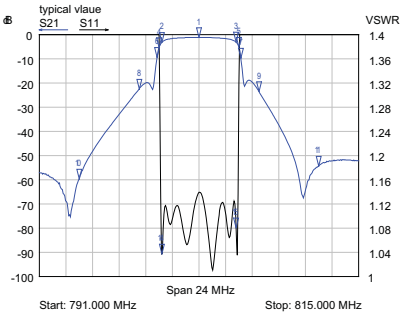
Part number **Connector**	**BN 61 65 01** **7-16 female**	**BN 61 65 01 C0004** **N female**
Frequency range	470 - 860 MHz	
Number / Size of cavities	**6 / 38**	
Harmonics attenuation	≥ 60 dB for f ≤ 1340 MHz	
TV standard	DVB-T @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ISDB-T @6 MHz ($\hat{U}/U_{rms}$ = 13 dB) / ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power	**≤ 100 W**	**≤ 100 W**
Tuning instruction	AS6214	AS6180 / AS6074
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.7 dB ≤ 0.9 dB f_0 ± 3.805 ≤ 1.7 dB ≤ 2.2 dB f_0 ± 3.885 ≤ 2.0 dB ≤ 2.5 dB f_0 ± 4.2 ≥ 5 dB f_0 ± 6.0 ≥ 17 dB f_0 ± 12.0 ≥ 38 dB	470 MHz 803 MHz f_0 ≤ 0.8 dB ≤ 1.3 dB f_0 ± 2.79 ≤ 1.7 dB ≤ 3.4 dB f_0 ± 3.00 ≥ 2 dB f_0 ± 3.15 ≥ 5 dB f_0 ± 4.5 ≥ 17 dB f_0 ± 9.0 ≥ 38 dB f_0 ± 15.0 ≥ 48 dB 470 MHz 803 MHz f_0 ≤ 0.9 dB ≤ 1.1 dB f_0 ± 2.69 ≤ 1.6 dB ≤ 1.9 dB f_0 ± 3.0 ≤ 2.8 dB ≤ 3.0 dB f_0 ± 3.5 ≥ 10 dB f_0 ± 4.0 ≥ 15 dB f_0 ± 6.0 ≥ 26 dB f_0 ± 9.0 ≥ 38 dB
VSWR (pass band range)	≤ 1.15	≤ 1.15
Group delay variation	Δτ ≤ 300 ns	Δτ ≤ 500 ns / Δτ ≤ 200 ns
Temperature stability	≤ 3 kHz / K	
Connectors	7-16 female	N female
Dimensions (L x W x H) mm	340 x 185 x 44	
Weight	ca. 3 kg	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

100 W - 130 W UHF DTV BANDPASS FILTERS

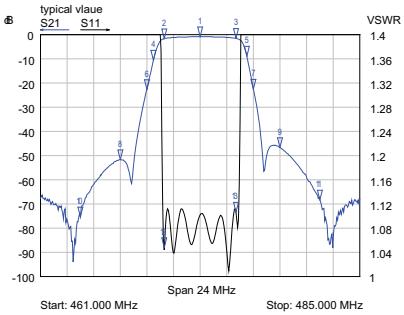
- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically
- low profile design



Typical diagram AS6361



Typical diagram AS6368



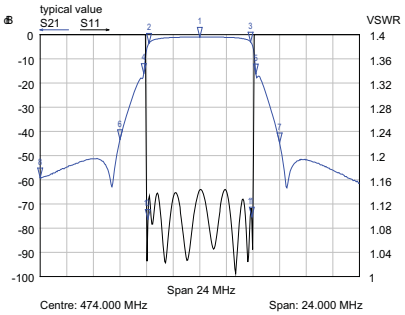
Typical diagram AS6362

Part number **Connector**	**BN 61 66 60 C1025** **7-16 female**		
Frequency range	470 - 860 MHz		
Number / Size of cavities	**6 / 40**		
Harmonics attenuation	≥ 50 dB for f ≤ 1400 MHz		
TV standard	DVB-T @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ISDB-T @6 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power	**≤ 130 W**	**≤ 100 W**	**≤ 100 W**
Tuning instruction	AS6361	AS6368	AS6362
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.7 dB ≤ 0.9 dB f_0 ± 3.805 ≤ 1.9 dB ≤ 2.4 dB f_0 ± 3.885 ≤ 2.2 dB ≤ 2.7 dB f_0 ± 4.2 ≥ 4 dB f_0 ± 6.0 ≥ 20 dB f_0 ± 12.0 ≥ 40 dB	470 MHz 803 MHz f_0 ≤ 1.0 dB ≤ 1.3 dB f_0 ± 2.79 ≤ 2.6 dB ≤ 3.2 dB f_0 ± 3.00 ≥ 4 dB f_0 ± 3.15 ≥ 8 dB f_0 ± 4.50 ≥ 22 dB f_0 ± 9.00 ≥ 50 dB f_0 ± 15.0 ≥ 50 dB	470 MHz 803 MHz f_0 ≤ 1.2 dB ≤ 1.7 dB f_0 ± 2.69 ≤ 2.2 dB ≤ 2.6 dB f_0 ± 3.25 ≥ 4 dB f_0 ± 3.50 ≥ 8 dB f_0 ± 4.0 ≥ 15 dB f_0 ± 6.0 ≥ 40 dB f_0 ± 9.0 ≥ 65 dB
VSWR (pass band range)	≤ 1.15	≤ 1.15	≤ 1.15
Group delay variation	$\Delta\tau$ ≤ 350 ns	$\Delta\tau$ ≤ 350 ns	$\Delta\tau$ ≤ 200 ns
Temperature stability	≤ 2 kHz / K		
Connectors	7-16 female		
Dimensions (L x W x H) mm	185 x 170 x 94		
Weight	ca. 2.8 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

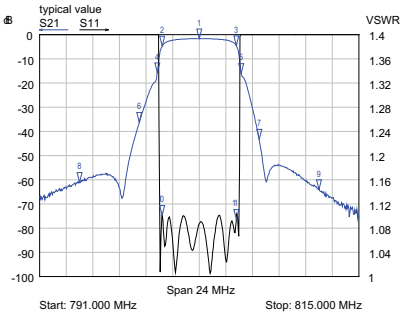
Data subject to change without notice – Edition E

100 W - 120 W UHF DTV BANDPASS FILTERS

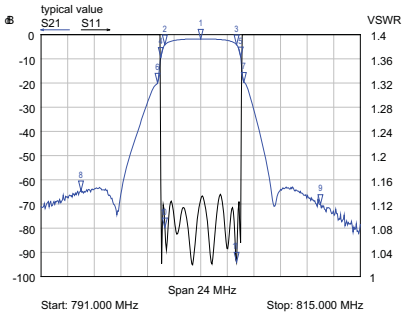
- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically
- low profile design



Typical diagram AS8131



Typical diagram AS8133

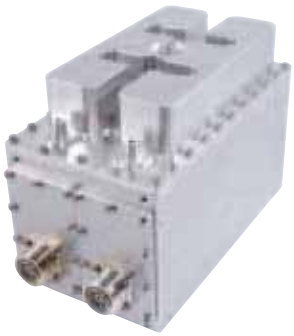


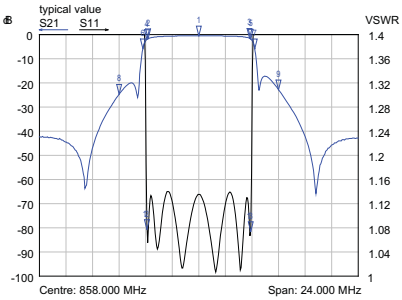
Typical diagram AS8132

Part number **Connector**	**BN 61 66 61 C1025** **7-16 female**		
Frequency range	470 - 860 MHz		
Number / Size of cavities	**8 / 40**		
Harmonics attenuation	≥ 50 dB for f ≤ 1400 MHz		
TV standard	DVB-T @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ISDB-T @6 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power	**≤ 120 W**	**≤ 100 W**	**≤ 100 W**
Tuning instruction	AS8131	AS8133	AS8132
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 1.1 dB ≤ 1.5 dB f_0 ± 3.805 ≤ 3.6 dB ≤ 5.2 dB f_0 ± 3.885 ≤ 4.4 dB ≤ 5.8 dB f_0 ± 4.2 ≥ 15 dB f_0 ± 6.0 ≥ 40 dB f_0 ± 12.0 ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 1.4 dB ≤ 1.75 dB f_0 ± 2.79 ≤ 4.4 dB ≤ 5.00 dB f_0 ± 3.15 ≥ 15 dB f_0 ± 4.50 ≥ 30 dB f_0 ± 9.00 ≥ 55 dB f_0 ± 15.0 ≥ 65 dB	470 MHz 803 MHz f_0 ≤ 1.5 dB ≤ 1.9 dB f_0 ± 2.69 ≤ 3.8 dB ≤ 4.4 dB f_0 ± 3.25 ≥ 5 dB f_0 ± 3.50 ≥ 18 dB f_0 ± 9.0 ≥ 64 dB
VSWR (pass band range)	≤ 1.15	≤ 1.11	≤ 1.15
Group delay variation	Δτ ≤ 600 ns	Δτ ≤ 500 ns	Δτ ≤ 400 ns
Temperature stability	≤ 2 kHz / K		
Connectors	7-16 female		
Dimensions (L x W x H) mm	230 x 170 x 94		
Weight	ca. 3.5 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

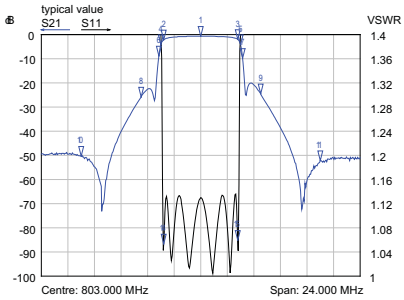
300 W - 375 W UHF DTV BANDPASS FILTERS

- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically
- low profile design

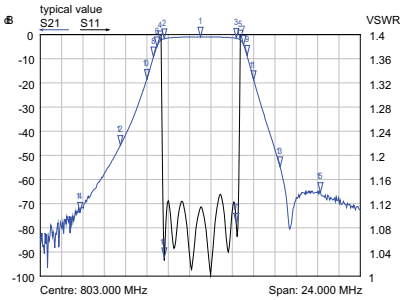




Typical diagram AS6201



Typical diagram AS6192

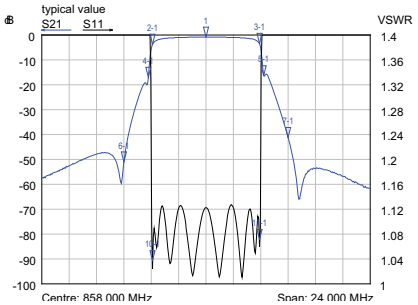


Typical diagram AS6257

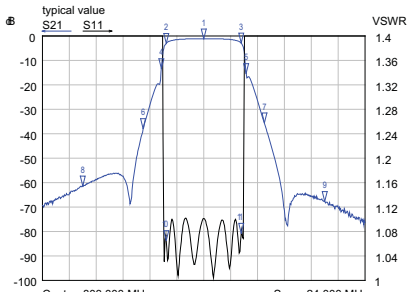
Part number	**BN 61 65 66 C1025**					
Frequency range	470 - 860 MHz					
Number / Size of cavities	**6 / 60**					
Harmonics attenuation	≥ 50 dB for f ≤ 1200 MHz					
TV standard	DVB-T @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)		ISDB-T @6 MHz ($\hat{U}/U_{rms}$ = 13 dB)		ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)	
Average input power	**≤ 375 W**		**≤ 300 W**		**≤ 300 W**	
Tuning instruction	AS6201		AS6192		AS6257	
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz	860 MHz	470 MHz	803 MHz	470 MHz	803 MHz
	f_0	≤ 0.45 dB	≤ 0.55 dB	f_0	≤ 0.6 dB	≤ 0.75 dB	f_0	≤ 0.7 dB	≤ 1.0 dB
	$f_0 \pm 3.805$	≤ 1.25 dB	≤ 1.75 dB	$f_0 \pm 2.79$	≤ 1.6 dB	≤ 2.20 dB	$f_0 \pm 2.69$	≤ 1.4 dB	≤ 1.7 dB
	$f_0 \pm 3.885$	≤ 1.45 dB	≤ 2.00 dB	$f_0 \pm 3.00$	≥ 4 dB		$f_0 \pm 3.0$	≤ 2.6 dB	≤ 2.7 dB
	$f_0 \pm 4.2$	≥ 4 dB		$f_0 \pm 3.15$	≥ 8 dB		$f_0 \pm 3.25$	≥ 4 dB	
	$f_0 \pm 6.0$	≥ 20 dB		$f_0 \pm 4.50$	≥ 23 dB		$f_0 \pm 3.5$	≥ 8 dB	
	$f_0 \pm 12.0$	≥ 40 dB		$f_0 \pm 9.00$	≥ 48 dB		$f_0 \pm 4.0$	≥ 15 dB	
				$f_0 \pm 15.0$	≥ 50 dB		$f_0 \pm 6.0$	≥ 40 dB	
							$f_0 \pm 9.0$	≥ 65 dB	
VSWR (pass band range)	≤ 1.15		≤ 1.15		≤ 1.15	
Group delay variation	$\Delta\tau \leq 350$ ns		$\Delta\tau \leq 350$ ns		$\Delta\tau \leq 200$ ns	
Temperature stability	≤ 2 kHz / K					
Connectors	7-16 female					
Dimensions (L x W x H) mm	260 x 129 x 175					
Weight	ca. 6 kg					
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“					

300 W - 375 W UHF DTV BANDPASS FILTERS

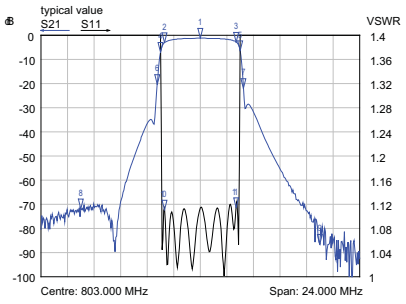
- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically
- low profile design



Typical diagram AS8087



Typical diagram AS8095

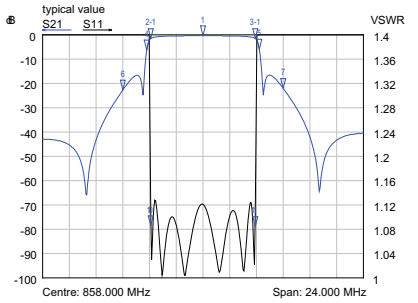


Typical diagram AS8084

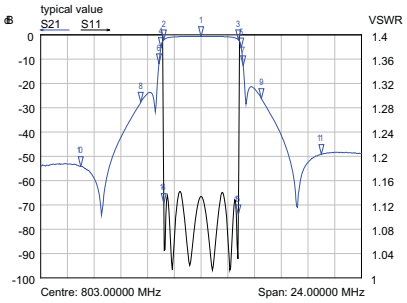
Part number	**BN 61 65 68 C1025**		
Frequency range	470 - 860 MHz		
Number / Size of cavities	**8 / 60**		
Harmonics attenuation	≥ 50 dB for f ≤ 1200 MHz		
TV standard	DVB-T @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ISDB-T @6 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power	**≤ 375 W**	**≤ 300 W**	**≤ 300 W**
Tuning instruction	AS8087	AS8095	AS8084
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.65 dB ≤ 0.90 dB $f_0 \pm 3.805$ ≤ 2.25 dB ≤ 3.05 dB $f_0 \pm 3.885$ ≤ 2.95 dB ≤ 3.75 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6.0$ ≥ 40 dB $f_0 \pm 12.0$ ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.75 dB ≤ 1.05 dB $f_0 \pm 2.79$ ≤ 2.15 dB ≤ 3.00 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9.0$ ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.9 dB ≤ 1.2 dB $f_0 \pm 2.69$ ≤ 2.25 dB ≤ 2.75 dB $f_0 \pm 3.0$ ≥ 4 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9.0$ ≥ 64 dB
VSWR (pass band range)	≤ 1.15	≤ 1.11	≤ 1.15
Group delay variation	$\Delta\tau \leq 660$ ns	$\Delta\tau \leq 500$ ns	$\Delta\tau \leq 420$ ns
Temperature stability	≤ 2 kHz / K		
Connectors	7-16 female		
Dimensions (L x W x H) mm	322 x 129 x 175		
Weight	ca. 7.6 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

600 W - 750 W UHF DTV BANDPASS FILTERS

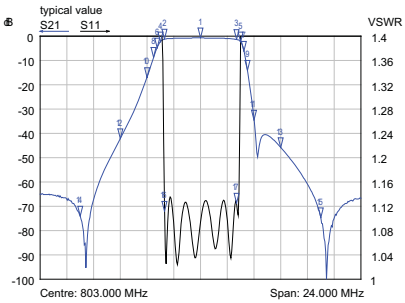
- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically
- low profile design



Typical diagram AS6186



Typical diagram AS6182



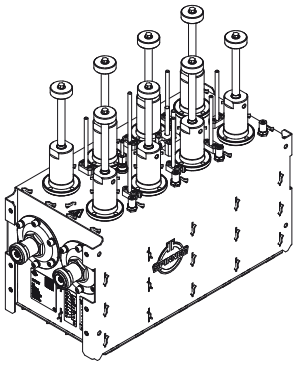
Typical diagram AS6156

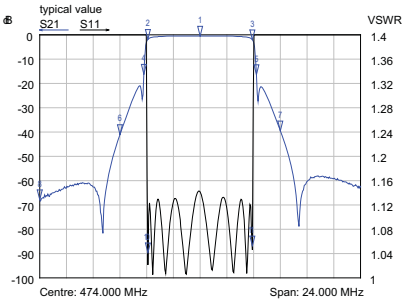
Part number	**BN 61 64 02**					
Frequency range	470 - 860 MHz					
Number / Size of cavities	**6 / 84**					
Harmonics attenuation	≥ 50 dB for f ≤ 950 MHz					
TV standard	DVB-T @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)		ISDB-T @6 MHz ($\hat{U}/U_{rms}$ = 13 dB)		ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)	
Average input power	**≤ 750 W**		**≤ 600 W**		**≤ 600 W**	
Tuning instruction	AS6186		AS6182		AS6156	
Insertion loss & Mask filtering (alternative tuning on request)		470 MHz 860 MHz		470 MHz 803 MHz		470 MHz 803 MHz
	f_0	≤ 0.4 dB ≤ 0.5 dB	f_0	≤ 0.5 dB ≤ 0.7 dB	f_0	≤ 0.6 dB ≤ 0.80 dB
	f_0 ± 3.805	≤ 1.1 dB ≤ 1.4 dB	f_0 ± 2.79	≤ 1.5 dB ≤ 2.1 dB	f_0 ± 2.69	≤ 1.0 dB ≤ 1.45 dB
	f_0 ± 3.885	≤ 1.2 dB ≤ 1.5 dB	f_0 ± 3.00	≥ 4 dB	f_0 ± 3.0	≤ 1.8 dB ≤ 2.35 dB
	f_0 ± 4.2	≥ 4 dB	f_0 ± 3.15	≥ 8 dB	f_0 ± 3.25	≥ 4 dB
	f_0 ± 6.0	≥ 20 dB	f_0 ± 4.5	≥ 23 dB	f_0 ± 3.5	≥ 8 dB
	f_0 ± 12.0	≥ 40 dB	f_0 ± 9.0	≥ 48 dB	f_0 ± 4.0	≥ 15 dB
			f_0 ± 15.0	≥ 50 dB	f_0 ± 6.0	≥ 40 dB
					f_0 ± 9.0	≥ 65 dB
VSWR (pass band range)	≤ 1.15		≤ 1.15		≤ 1.15	
Group delay variation	Δτ ≤ 330 ns		Δτ ≤ 500 ns		Δτ ≤ 200 ns	
Temperature stability	≤ 2 kHz / K					
Connectors	7-16 female					
Dimensions (L x W x H) mm	328 x 174 x 377					
Weight	ca. 11 kg					
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“					

Data subject to change without notice – Edition E

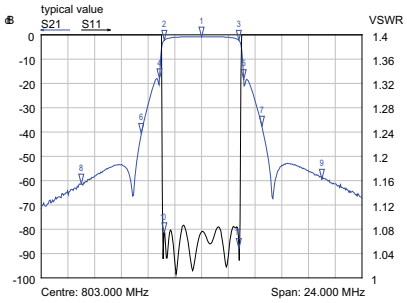
600 W - 750 W UHF DTV BANDPASS FILTERS

- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically
- low profile design

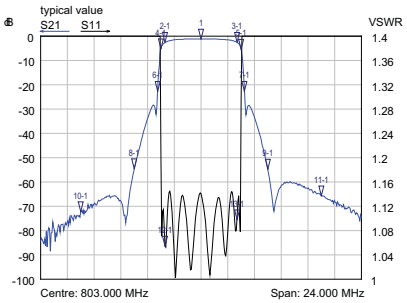




Typical diagram AS8068



Typical diagram AS8091

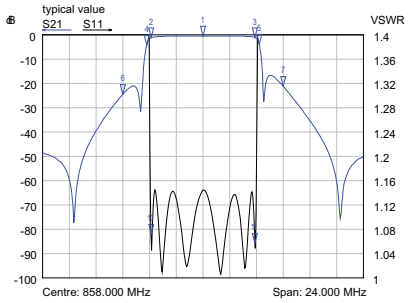


Typical diagram AS8051

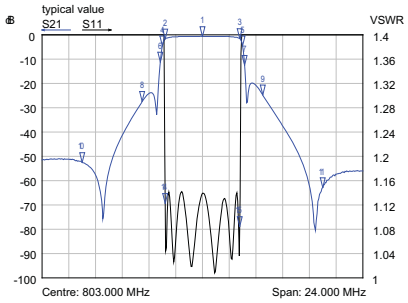
Part number	**BN 61 64 03**					
Frequency range	470 - 860 MHz					
Number / Size of cavities	**8 / 84**					
Harmonics attenuation	≥ 50 dB for f ≤ 950 MHz					
TV standard	DVB-T @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)		ISDB-T @6 MHz ($\hat{U}/U_{rms}$ = 13 dB)		ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)	
Average input power	**≤ 750 W**		**≤ 600 W**		**≤ 600 W**	
Tuning instruction	AS8068		AS8091		AS8051	
Insertion loss & Mask filtering (alternative tuning on request)		470 MHz 860 MHz		470 MHz 803 MHz		470 MHz 803 MHz
	f_0	≤ 0.5 dB ≤ 0.65 dB	f_0	≤ 0.6 dB ≤ 1.2 dB	f_0	≤ 0.8 dB ≤ 1.2 dB
	f_0 ± 3.805	≤ 1.7 dB ≤ 2.10 dB	f_0 ± 2.79	≤ 1.7 dB ≤ 3.0 dB	f_0 ± 2.69	≤ 1.8 dB ≤ 2.6 dB
	f_0 ± 3.885	≤ 2.0 dB ≤ 2.50 dB	f_0 ± 3.15	≥ 15 dB	f_0 ± 3.00	≥ 3 dB
	f_0 ± 4.20	≥ 15 dB	f_0 ± 4.50	≥ 30 dB	f_0 ± 3.25	≥ 18 dB
	f_0 ± 6.00	≥ 40 dB	f_0 ± 9.00	≥ 55 dB	f_0 ± 9.00	≥ 64 dB
	f_0 ± 12.0	≥ 55 dB				
VSWR (pass band range)	≤ 1.15		≤ 1.11		≤ 1.15	
Group delay variation	Δτ ≤ 600 ns		Δτ ≤ 500 ns		Δτ ≤ 400 ns	
Temperature stability	≤ 2 kHz / K					
Connectors	7-16 female					
Dimensions (L x W x H) mm	411 x 174 x 377					
Weight	ca. 14 kg					
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“					

1.3 KW - 1.6 KW UHF DTV BANDPASS FILTER

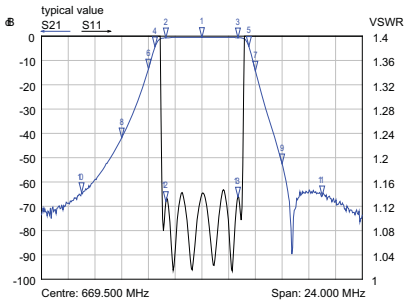
- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically
- low profile design



Typical diagram AS6224



Typical diagram AS6229



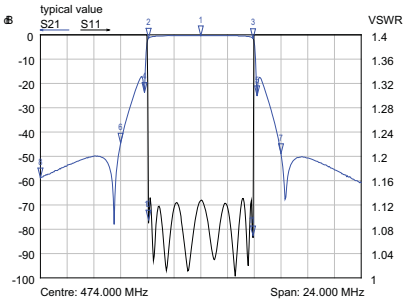
Typical diagram AS6228

Part number **Connectors**	**BN 61 66 63 C1031** **1 5/8" SMS unflanged**	**BN 61 66 63 C1033** **1 5/8" EIA**
Frequency range	470 - 860 MHz	
Number / Size of cavities	**6 / 120**	
Harmonics attenuation	≥ 50 dB for f ≤ 1100 MHz	
TV standard	DVB-T @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ISDB-T @6 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power	**≤ 1.6 kW**	**≤ 1.3 kW**	**≤ 1.3 kW**
Tuning instruction	AS6224	AS6229	AS6228
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.3 dB ≤ 0.4 dB $f_0 \pm 3.805$ ≤ 0.8 dB ≤ 1.1 dB $f_0 \pm 3.885$ ≤ 0.9 dB ≤ 1.3 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6.0$ ≥ 20 dB $f_0 \pm 12.0$ ≥ 40 dB	470 MHz 803 MHz f_0 ≤ 0.35 dB ≤ 0.5 dB $f_0 \pm 2.79$ ≤ 1.10 dB ≤ 1.4 dB $f_0 \pm 3.00$ ≥ 3 dB $f_0 \pm 3.15$ ≥ 5 dB $f_0 \pm 4.50$ ≥ 17 dB $f_0 \pm 9.00$ ≥ 38 dB $f_0 \pm 15.0$ ≥ 48 dB	470 MHz 803 MHz f_0 ≤ 0.40 dB ≤ 0.55 dB $f_0 \pm 2.69$ ≤ 0.55 dB ≤ 1.30 dB $f_0 \pm 3.5$ ≥ 3 dB $f_0 \pm 4.0$ ≥ 8 dB $f_0 \pm 6.0$ ≥ 30 dB $f_0 \pm 9.0$ ≥ 65 dB
VSWR (pass band range)	≤ 1.15	≤ 1.15	≤ 1.15
Group delay variation	$\Delta\tau \leq 350$ ns	$\Delta\tau \leq 450$ ns	$\Delta\tau \leq 250$ ns
Temperature stability	≤ 2 kHz / K		
Connectors	1 5/8" SMS unflanged	1 5/8" EIA	
Dimensions (L x W x H) mm	463 x 300 x 277	480 x 300 x 277	
Weight	ca. 20 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

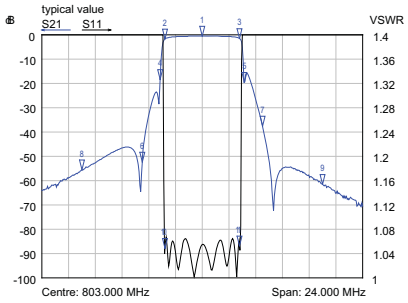
Data subject to change without notice – Edition E

1.3 KW - 1.6 KW UHF DTV BANDPASS FILTER

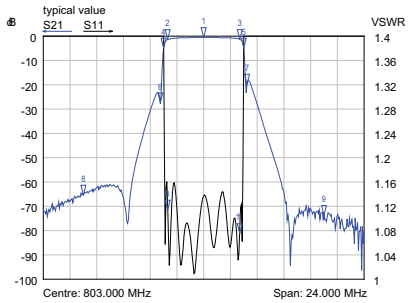
- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically
- low profile design



Typical diagram AS8112



Typical diagram AS8117



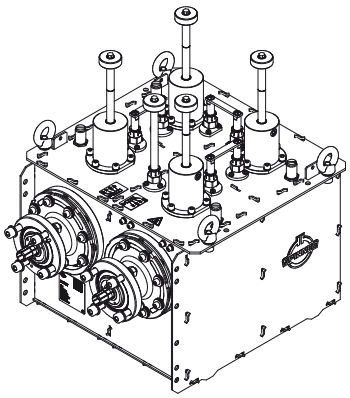
Typical diagram AS8115

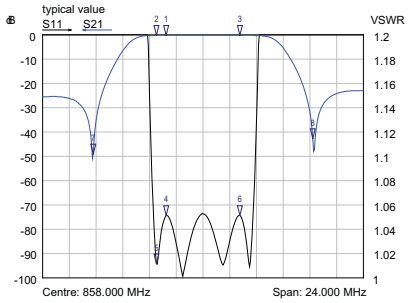
Part number **Connectors**	**BN 61 66 64 C1031** **1 5/8" SMS unflanged**	**BN 61 66 64 C1033** **1 5/8" EIA**
Frequency range	470 - 860 MHz	
Number / Size of cavities	**8 / 120**	
Harmonics attenuation	≥ 50 dB for f ≤ 1100 MHz	
TV standard	DVB-T @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ISDB-T @6 MHz ($\hat{U}/U_{rms}$ = 13 dB)
Average input power	**≤ 1.6 kW**	**≤ 1.3 kW**
Tuning instruction	AS8112	AS8117
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.4 dB ≤ 0.5 dB f_0 ± 3.805 ≤ 1.4 dB ≤ 1.9 dB f_0 ± 3.885 ≤ 1.5 dB ≤ 2.3 dB f_0 ± 4.2 ≥ 15 dB f_0 ± 6.0 ≥ 40 dB f_0 ± 12.0 ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.45 dB ≤ 0.6 dB f_0 ± 2.79 ≤ 1.20 dB ≤ 1.7 dB f_0 ± 3.15 ≥ 15 dB f_0 ± 4.5 ≥ 30 dB f_0 ± 9.0 ≥ 55 dB
VSWR (pass band range)	≤ 1.15	≤ 1.09
Group delay variation	Δτ ≤ 550 ns	Δτ ≤ 600 ns
Temperature stability	≤ 2 kHz / K	
Connectors	1 5/8" SMS unflanged	1 5/8" EIA
Dimensions (L x W x H) mm	584 x 300 x 277	600 x 300 x 277
Weight	ca. 22 kg	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

Part number **Connectors**	**BN 61 66 64 C1033** **1 5/8" EIA**
ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)	
≤ 1.3 kW	
AS8115	
470 MHz 803 MHz f_0 ≤ 0.5 dB ≤ 0.6 dB f_0 ± 2.69 ≤ 1.2 dB ≤ 1.5 dB f_0 ± 3.00 ≥ 4 dB f_0 ± 3.25 ≥ 18 dB f_0 ± 9.0 ≥ 64 dB	
≤ 1.15	
Δτ ≤ 400 ns	

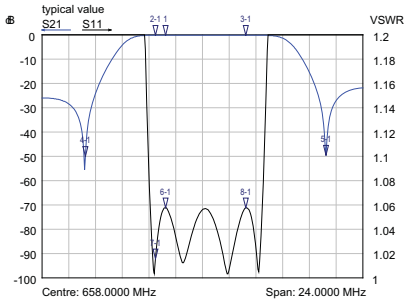
5 KW UHF ATV BANDPASS FILTER

- mask filter for ATV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically

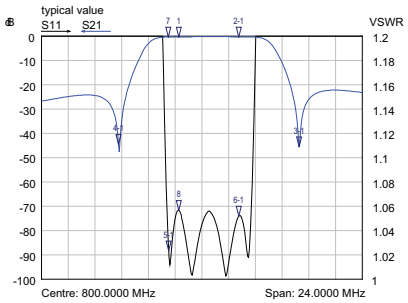




Typical diagram AS4025



Typical diagram AS4017



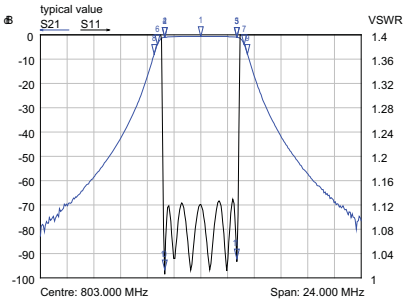
Typical diagram AS4024

Part number	**BN 61 64 04**		
Frequency range	470 - 860 MHz		
Number / Size of cavities	**4 / 150**		
Harmonics attenuation	≥ 40 dB for f ≤ 860 MHz		
Mask filtering	ATV 8 MHz	ATV 8 MHz	ATV 6 MHz
Average input power	**≤ 5 kW ≡ 7/0.7 kW**	**≤ 5 kW ≡ 7/0.7 kW**	**≤ 5 kW ≡ 7/0.7 kW**
Tuning instruction	Standard G: AS4025 Standard K: AS4015	Standard I: AS4017	Standard M, N: AS4024
Insertion loss & Mask filtering (alternative tuning on request)	$f_{(V)} - \Delta$ > 30.0 dB $f_{(V) - 0.75\ MHz}$ ≤ 0.35 dB $f_{(V)}$ ≤ 0.25 dB $f_{(S)} = f_{(V)} + \Delta$ ≤ 0.25 dB $f_{(V)} + 2\Delta$ > 30.0 dB	$f_{(V)} - \Delta$ > 30.0 dB $f_{(V) - 0.75\ MHz}$ ≤ 0.35 dB $f_{(V)}$ ≤ 0.30 dB $f_{(S)} = f_{(V)} + \Delta$ ≤ 0.30 dB $f_{(V)} + 2\Delta$ > 30.0 dB	$f_{(V)} - \Delta$ > 40.0 dB $f_{(V) - 0.75\ MHz}$ ≤ 0.35 dB $f_{(V)}$ ≤ 0.30 dB $f_{(S)} = f_{(V)} + \Delta$ ≤ 0.30 dB $f_{(V)} + 2\Delta$ > 40.0 dB
VSWR (pass band range)		$f_{(V) - 0.75\ MHz}$ ≤ 1.10 $f_{(V)}$ ≤ 1.06 $f_{(S)} = f_{(V)} + \Delta$ ≤ 1.06	
Group delay variation		$\Delta\tau \leq 50$ ns	
Temperature stability	≤ 2 kHz / K		
Connectors	1 5/8" EIA male		
Dimensions (L x W x H) mm	387 x 326 x 412		
Weight	ca. 22 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

Data subject to change without notice – Edition E

2.25 KW UHF DTV BANDPASS FILTER

- mask filter for ATSC
- for 6, 7 and 8 MHz channel bandwidth
- without cross coupling
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically

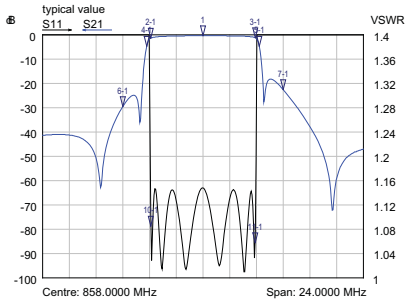


Typical diagram AS6081

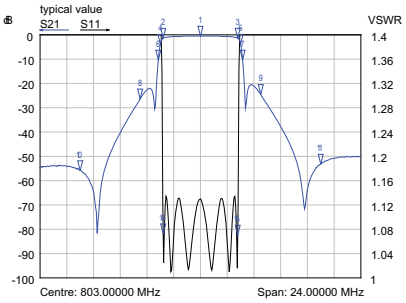
Part number	**BN 61 65 72**
Frequency range	470 - 860 MHz
Number / Size of cavities	**6 / 150**
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz
TV standard	ATSC @6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power	**≤ 2.25 kW**
Tuning instruction	AS6081
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 803 MHz f_0 ≤ 0.55 dB ≤ 0.75 dB $f_0 \pm 2.69$ ≤ 0.80 dB ≤ 1.00 dB $f_0 \pm 3.00$ ≤ 2.00 dB ≤ 2.30 dB $f_0 \pm 3.25$ ≥ 3 dB $f_0 \pm 3.50$ ≥ 8 dB $f_0 \pm 4.00$ ≥ 15 dB $f_0 \pm 6.00$ ≥ 40 dB $f_0 \pm 9.00$ ≥ 65 dB
VSWR (pass band range)	≤ 1.15
Group delay variation	$\Delta\tau \leq 200$ ns
Temperature stability	≤ 2 kHz / K
Connectors	1 5/8" EIA male
Dimensions (L x W x H) mm	528 x 326 x 411
Weight	ca. 29 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“

2.0 KW - 2.5 KW UHF DTV BANDPASS FILTER

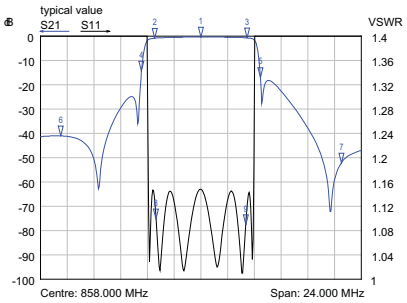
- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically



Typical diagram AS6193



Typical diagram AS6184



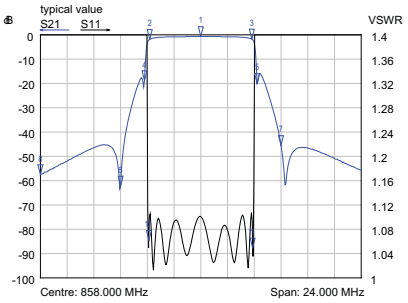
Typical diagram AS6289

Part number	**BN 61 65 18 C0010**		
Frequency range	470 - 860 MHz		
Number / Size of cavities	**6 / 150**		
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz		
TV standard	DVB-T @8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ISDB-T @6 MHz ($\hat{U}/U_{rms}$ = 13 dB)	DVB-T @7 MHz ($\hat{U}/U_{rms}$ = 13 dB)
Average input power	**≤ 2.5 kW**	**≤ 2 kW**	**≤ 2.25 kW**
Tuning instruction	AS6193	AS6184	AS6289
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.30 dB ≤ 0.45 dB f_0 ± 3.805 ≤ 0.75 dB ≤ 1.20 dB f_0 ± 3.885 ≤ 0.95 dB ≤ 1.40 dB f_0 ± 4.2 ≥ 4 dB f_0 ± 6.0 ≥ 20 dB f_0 ± 12.0 ≥ 40 dB	470 MHz 803 MHz f_0 ≤ 0.4 dB ≤ 0.6 dB f_0 ± 2.79 ≤ 1.1 dB ≤ 1.5 dB f_0 ± 3.00 ≥ 3.5 dB f_0 ± 3.15 ≥ 8.0 dB f_0 ± 4.5 ≥ 23 dB f_0 ± 9.0 ≥ 48 dB f_0 ± 15.0 ≥ 50 dB	470 MHz 803 MHz f_0 ≤ 0.35 dB ≤ 0.50 dB f_0 ± 3.2 ≤ 0.55 dB ≤ 0.85 dB f_0 ± 4.2 ≥ 13 dB f_0 ± 10.5 ≥ 38 dB
VSWR (pass band range)	≤ 1.15	≤ 1.15	≤ 1.15
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 500 ns	Δτ ≤ 150 ns
Temperature stability	≤ 2 kHz / K		
Connectors	1 5/8" EIA		
Dimensions (L x W x H) mm	497 x 326 x 411		
Weight	ca. 28 kg		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

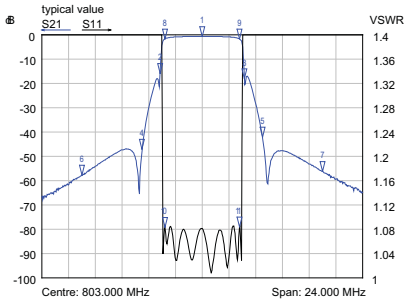
Data subject to change without notice – Edition E

1.6 KW - 2.0 KW UHF DTV BANDPASS FILTER

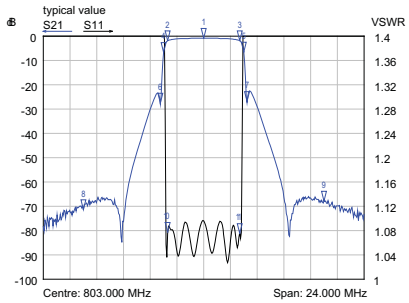
- mask filter for ATV and DTV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically



Typical diagram AS8071



Typical diagram AS8096

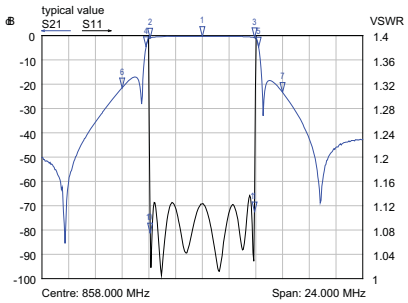


Typical diagram AS8094

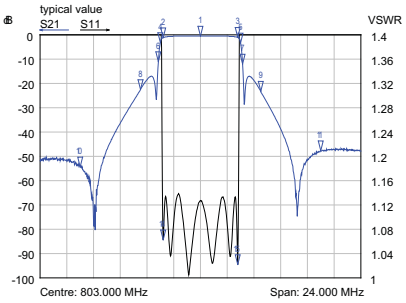
Part number **Connector**	**BN 61 65 42 C0010** **1 5/8" EIA**		**BN 61 65 42 C0011** **7-16 female**	
Frequency range	470 - 860 MHz			
Number / Size of cavities	**8 / 150**			
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz			
TV standard	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB)		ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power	**≤ 2 kW**		**≤ 1.6 kW**	**≤ 1.6 kW**
Tuning instruction	AS8071		AS8096	AS8094
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz / 860 MHz		470 MHz / 803 MHz	470 MHz / 803 MHz
	f_0	≤ 0.4 dB / ≤ 0.65 dB	f_0	≤ 0.50 dB / ≤ 0.70 dB	f_0	≤ 0.70 dB / ≤ 0.90 dB
	$f_0 \pm 3.805$	≤ 1.5 dB / ≤ 2.10 dB	$f_0 \pm 2.79$	≤ 1.30 dB / ≤ 1.75 dB	$f_0 \pm 2.69$	≤ 1.50 dB / ≤ 2.00 dB
	$f_0 \pm 3.885$	≤ 1.7 dB / ≤ 2.40 dB	$f_0 \pm 3.15$	≥ 15 dB	$f_0 \pm 3.00$	≥ 4 dB
	$f_0 \pm 4.2$	≥ 15 dB	$f_0 \pm 4.5$	≥ 30 dB	$f_0 \pm 3.25$	≥ 18 dB
	$f_0 \pm 6.0$	≥ 40 dB	$f_0 \pm 9.0$	≥ 55 dB	$f_0 \pm 9.0$	≥ 64 dB
	$f_0 \pm 12.0$	≥ 55 dB				
VSWR (pass band range)	≤ 1.15		≤ 1.11		≤ 1.10	
Group delay variation	Δτ ≤ 700 ns		Δτ ≤ 500 ns		Δτ ≤ 400 ns	
Temperature stability	≤ 2 kHz / K					
Connectors	1 5/8" EIA		7-16 female			
Dimensions (L x W x H) mm	639 x 326 x 411		675 x 326 x 411			
Weight	ca. 36 kg					
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“					

3 KW - 7.5 KW UHF DTV BANDPASS FILTER

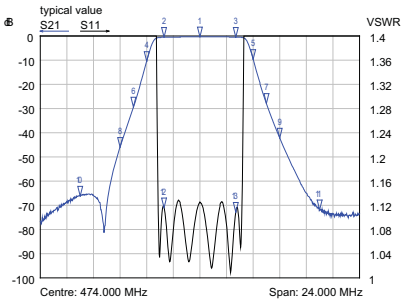
- mask filter for DTV and ATV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within the whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically
- low profile design
- natural or liquid cooling



Typical diagram AS6217



Typical diagram AS6222



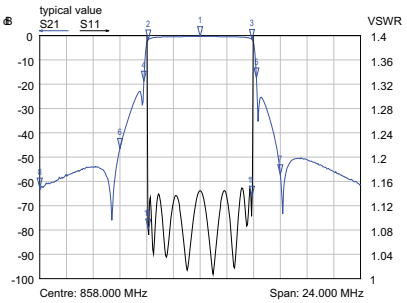
Typical diagram AS6221

Part number / Connectors **Cooling**	**BN 61 66 65 C1031 1 5/8" SMS unflanged** **BN 61 66 65 C1033 1 5/8" EIA** **natural cooling**			**BN 61 66 65 C2041 3 1/8" SMS unflanged** **BN 61 66 65 C2043 3 1/8" EIA** **liquid cooling**		
Frequency range	470 - 860 MHz					
Number / Size of cavities	**6 / 170**					
Harmonics attenuation	≥ 50 dB for f ≤ 1000 MHz					
Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB)			ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$ = 13 dB)			ATSC @ 6 MHz ($\hat{U}/U_{rms}$ = 11 dB)	
Average input power	**≤ 3.75 kW natural cooling** **≤ 7.50 kW liquid cooling**			**≤ 3.0 kW natural cooling** **≤ 6.0 kW liquid cooling**			**≤ 3.0 kW natural cooling** **≤ 6.0 kW liquid cooling**	
Tuning instruction	AS6217			AS6222			AS6221	
Insertion loss & Mask filtering (alternative tuning on request)		470 MHz	860 MHz		470 MHz	803 MHz		470 MHz 803 MHz
	f_0	≤ 0.25 dB	≤ 0.35 dB	f_0	≤ 0.40 dB	≤ 0.50 dB	f_0	≤ 0.40 dB ≤ 0.50 dB
	f_0 ± 3.805	≤ 0.75 dB	≤ 0.90 dB	f_0 ± 2.79	≤ 1.05 dB	≤ 1.25 dB	f_0 ± 2.69	≤ 0.60 dB ≤ 0.75 dB
	f_0 ± 3.885	≤ 0.90 dB	≤ 1.00 dB	f_0 ± 3.00	≥ 3dB		f_0 ± 3.50	≥ 3 dB
	f_0 ± 4.2	≥ 4 dB		f_0 ± 3.15	≥ 5 dB		f_0 ± 4.00	≥ 8 dB
	f_0 ± 6.0	≥ 20 dB		f_0 ± 4.5	≥ 17 dB		f_0 ± 6.00	≥ 30 dB
	f_0 ± 12.0	≥ 40 dB		f_0 ± 9.0	≥ 38 dB		f_0 ± 9.00	≥ 65 dB
				f_0 ± 15.0	≥ 48 dB			
VSWR (pass band range)	≤ 1.15			≤ 1.15			≤ 1.15	
Group delay variation	Δτ ≤ 350 ns			Δτ ≤ 400 ns			Δτ ≤ 150 ns	
Temperature stability	≤ 2 kHz / K							
Dimensions (L x W x H) mm	602 x 448 x 271 BN 61 66 65 C1031 617 x 448 x 271 BN 61 66 65 C1033			606 x 448 x 271 BN 61 66 65 C2041 630 x 448 x 271 BN 61 66 65 C2043				
Weight	ca. 36 kg							
Coolant / Flow rate	–			mix: glycol and water BN 15 45 67 / ≥ 3 l/min				
Temperature of the coolant	–			10 °C - 55 °C				
Cooling interface	–			aluminium tube 12 mm x 1 mm unflanged				
Cooling accessories	–			see appendix				
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“							

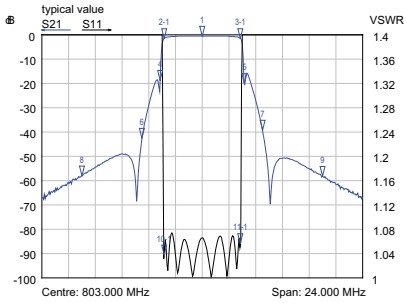
Data subject to change without notice – Edition E

3 KW - 6.25 KW UHF DTV BANDPASS FILTER

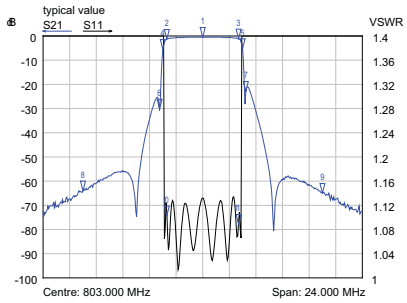
- mask filter for DTV and ATV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within the whole UHF range
- temperature compensated
- DC block
- installation horizontally or vertically
- low profile design
- natural or liquid cooling



Typical diagram AS8100



Typical diagram AS8104

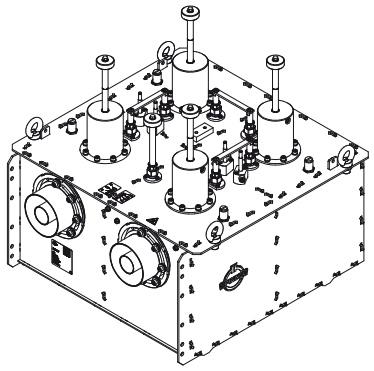


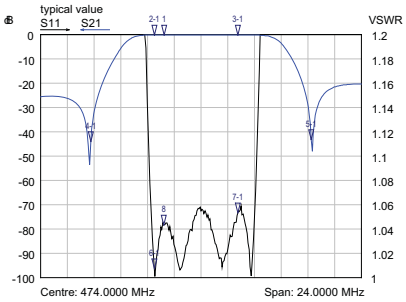
Typical diagram AS8103

Part number / Connectors **Cooling**	**BN 61 66 66 C1031 1 5/8" SMS unflanged** **BN 61 66 66 C1033 1 5/8" EIA** **natural cooling**		**BN 61 66 66 C2041 3 1/8" SMS unflanged** **BN 61 66 66 C2043 3 1/8" EIA** **liquid cooling**			
Frequency range	470 - 860 MHz					
Number / Size of cavities	**8 / 170**					
Harmonics attenuation	≥ 50 dB for f ≤ 1000 MHz					
Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB)		ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$ = 13 dB)		ATSC @ 6 MHz ($\hat{U}/U_{rms}$ = 11 dB)	
Average input power	**≤ 3.75 kW natural cooling** **≤ 6.25 kW liquid cooling**		**≤ 3.0 kW natural cooling** **≤ 5.0 kW liquid cooling**		**≤ 3.0 kW natural cooling** **≤ 5.0 kW liquid cooling**	
Tuning instruction	AS8100		AS8104		AS8103	
Insertion loss & Mask filtering (alternative tuning on request)		470 MHz 860 MHz		470 MHz 803 MHz		470 MHz 803 MHz
	f_0	≤ 0.35 dB ≤ 0.45 dB	f_0	≤ 0.4 dB ≤ 0.5 dB	f_0	≤ 0.45 dB ≤ 0.55 dB
	f_0 ± 3.805	≤ 1.10 dB ≤ 1.80 dB	f_0 ± 2.79	≤ 1.3 dB ≤ 1.7 dB	f_0 ± 2.69	≤ 1.05 dB ≤ 1.40 dB
	f_0 ± 3.885	≤ 1.40 dB ≤ 2.00 dB	f_0 ± 3.15	≥ 12 dB	f_0 ± 3.00	≥ 4 dB
	f_0 ± 4.2	≥ 15 dB	f_0 ± 4.5	≥ 28 dB	f_0 ± 3.25	≥ 18 dB
	f_0 ± 6.0	≥ 40 dB	f_0 ± 9.0	≥ 54 dB	f_0 ± 9.00	≥ 64 dB
	f_0 ± 12.0	≥ 55 dB				
VSWR (pass band range)	≤ 1.15		≤ 1.09		≤ 1.15	
Group delay variation	Δτ ≤ 700 ns		Δτ ≤ 650 ns		Δτ ≤ 500 ns	
Temperature stability	≤ 2 kHz / K					
Dimensions (L x W x H) mm	773 x 448 x 271 BN 61 66 66 C1031 789 x 448 x 271 BN 61 66 66 C1033		778 x 448 x 271 BN 61 66 66 C2041 801 x 448 x 271 BN 61 66 66 C2043			
Weight	ca. 46 kg					
Coolant / Flow rate	–		mix: glycol and water BN 15 45 67 / ≥ 3 l/min			
Temperature of the coolant	–		10 °C - 55 °C			
Cooling interface	–		aluminium tube 12 mm x 1 mm unflanged			
Cooling accessories	–		see appendix			
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“					

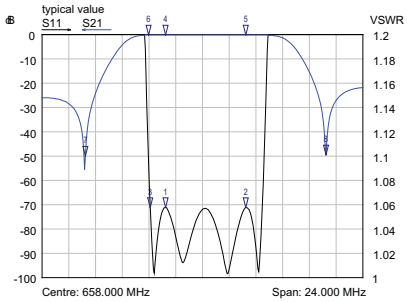
6 KW - 14 KW UHF ATV BANDPASS FILTER

- mask filter for ATV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within the whole UHF range
- temperature compensated
- installation horizontally or vertically
- DC block
- natural or liquid cooling

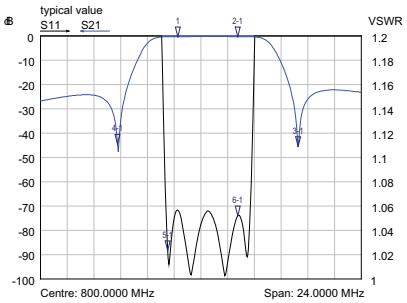




Typical diagram AS4009



Typical diagram AS4018



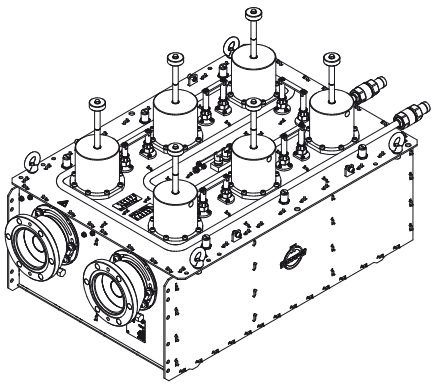
Typical diagram AS4033

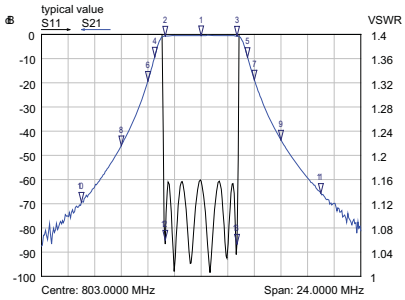
Part number / Connectors **Cooling**	**BN 61 64 09** **3 1/8" SMS unflanged** **BN 61 64 09 C0002** **3 1/8" EIA** **natural cooling**		**BN 61 64 09 C0020** **3 1/8" SMS unflanged** **BN 61 64 09 C0022** **3 1/8" EIA** **liquid cooling**	
Frequency range	470 - 860 MHz			
Number / Size of cavities	**4 / 200**			
Harmonics attenuation	≥ 40 dB for f ≤ 800 MHz			
Mask filtering	ATV 8 MHz		ATV 8 MHz	ATV 6 MHz
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	natural cooling **≤ 7.5 kW** liquid cooling **≤ 14 kW** @ 0 - 500 m **≤ 12 kW** @ 1600 m **≤ 10 kW** @ 2600 m **≤ 8 kW** @ 3800 m		natural cooling **≤ 7.5 kW** liquid cooling **≤ 14 kW** @ 0 - 500 m **≤ 12 kW** @ 1600 m **≤ 10 kW** @ 2600 m **≤ 8 kW** @ 3800 m	natural cooling **≤ 6 kW** liquid cooling **≤ 11.2 kW** @ 0 - 600 m **≤ 10 kW** @ 1300 m **≤ 8 kW** @ 2600 m **≤ 6 kW** @ 4000 m
Tuning instruction (alternative tuning on request)	Standard G: AS4009		Standard I: AS4018 Standard K: AS4014	Standard M: AS4033
	470 MHz 860 MHz		470 MHz 860 MHz	470 MHz 860 MHz
	$f_{(V)} - \Delta$ > 40.0 dB > 40.0 dB		$f_{(V)} - \Delta$ > 40.0 dB > 40.0 dB	$f_{(V)} - \Delta$ > 40.0 dB > 40.0 dB
	$f_{(V) - 0.75\ MHz}$ ≤ 0.15 dB ≤ 0.20 dB		$f_{(V) - 0.75\ MHz}$ ≤ 0.20 dB ≤ 0.20 dB	$f_{(V) - 0.75\ MHz}$ ≤ 0.25 dB ≤ 0.25 dB
	$f_{(V)}$ ≤ 0.15 dB ≤ 0.20 dB		$f_{(V)}$ ≤ 0.20 dB ≤ 0.20 dB	$f_{(V)}$ ≤ 0.25 dB ≤ 0.25 dB
	$f_{(S)} = f_{(V)} + \Delta$ ≤ 0.15 dB ≤ 0.20 dB		$f_{(S)} = f_{(V)} + \Delta$ ≤ 0.20 dB ≤ 0.20 dB	$f_{(S)} = f_{(V)} + \Delta$ ≤ 0.25 dB ≤ 0.25 dB
	$f_{(V)} + 2\Delta$ > 40.0 dB > 40.0 dB		$f_{(V)} + 2\Delta$ > 40.0 dB > 40.0 dB	$f_{(V)} + 2\Delta$ > 40.0 dB > 40.0 dB
VSWR (pass band range)	$f_{(V) - 0.75\ MHz}$ ≤ 1.06 $f_{(V)}$ ≤ 1.06 $f_{(S)} = f_{(V)} + \Delta$ ≤ 1.06			
Group delay variation	Δτ ≤ 50 ns			
Temperature stability	≤ 2 kHz / K			
Dimensions (L x W x H) mm	463 x 450 x 442 BN 61 64 09 487 x 450 x 442 BN 61 64 09 C0002		463 x 450 x 442 BN 61 64 09 C0020 487 x 450 x 442 BN 61 64 09 C0022	
Weight	ca. 35 kg		ca. 35 kg	
Coolant / Flow rate	–		mix: glycol and water BN 15 45 67 / ≥ 3 l/min	
Temperature of the coolant	–		20 °C - 60 °C	
Cooling interface	–		for hose with inner width 3/4"	
Material of cooling	–		stainless steel pipe	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

Data subject to change without notice – Edition E

4.5 KW - 10 KW UHF DTV BANDPASS FILTER

- mask filter for ATSC
- for 6, 7 and 8 MHz channel bandwidth
- without cross coupling (notch function)
- tuneable within the whole UHF range
- temperature compensated
- installation horizontally or vertically
- DC block
- natural or liquid cooling



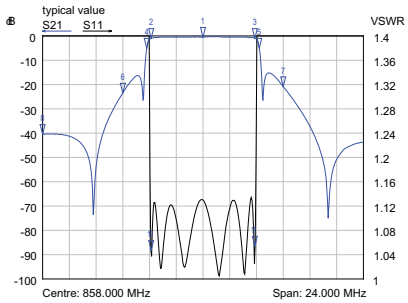


Typical diagram AS6082

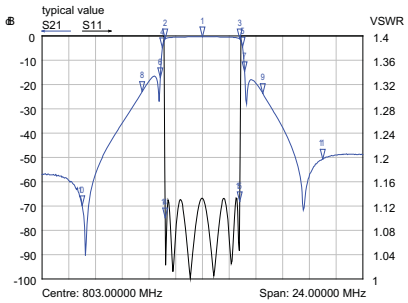
Part number / Connetors Cooling	**BN 61 65 71 1 5/8" EIA male natural cooling**	**BN 61 65 70 3 1/8" EIA liquid cooling**
Frequency range	470 - 810 MHz	
Number / Size of cavities	**6 / 200**	
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz	
Mask filtering	ATSC @ 6 MHz (Ü/Urms=11 dB)	
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	**≤ 4.5 kW**	**≤ 10 kW @ 0 - 600 m ≤ 8 kW @ 2000 m ≤ 6 kW @ 3400 m**
Tuning instruction	AS6082	
Insertion loss & Mask filtering (alternative tuning on request)	473 MHz 803 MHz f_0 ≤ 0.4 dB ≤ 0.60 dB f_0 ± 2.69 ≤ 0.6 dB ≤ 0.80 dB f_0 ± 3.00 ≤ 1.5 dB ≤ 1.75 dB f_0 ± 4.00 ≥ 15 dB f_0 ± 6.00 ≥ 40 dB f_0 ± 9.00 ≥ 65 dB	
VSWR (pass band range)	≤ 1.17	
Group delay variation	Δτ ≤ 200 ns	
Temperature stability	≤ 2 kHz / K	
Dimensions (L x W x H) mm	702 x 450 x 450	772 x 450 x 450
Weight	ca. 48 kg	ca. 48 kg
Coolant / Flow rate	–	mix: glycol and water BN 15 45 67 / ≥ 3 l/min
Temperature of the coolant	–	20 °C - 60 °C
Cooling interface	–	for hose with inner width 3/4"
Material of cooling	–	stainless steel pipe
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

4 KW - 12.5 KW UHF DTV BANDPASS FILTER

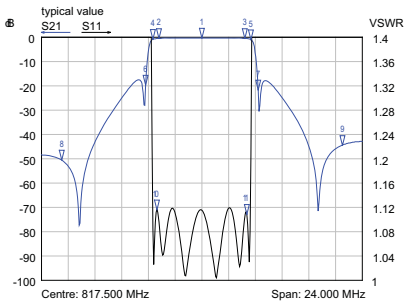
- mask filter for DTV and ATV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within the whole UHF range
- temperature compensated
- installation horizontally or vertically
- DC block
- natural or liquid cooling



Typical diagram AS6194



Typical diagram AS6185



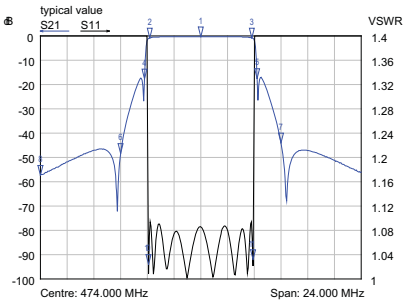
Typical diagram AS6290

Part number / Connectors	**BN 61 65 40 C0010 1 5/8" EIA**		**BN 61 65 50 C0020 3 1/8" SMS unflanged** **BN 61 65 50 C0021 1 5/8" EIA** **BN 61 65 50 C0022 3 1/8" EIA male**
Cooling	**natural cooling**		**liquid cooling**
Frequency range	470 - 860 MHz		
Number / Size of cavities	**6 / 200**		
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz		
Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$ = 13 dB)	DVB-T @ 7 MHz ($\hat{U}/U_{rms}$ = 13 dB)
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	natural cooling **≤ 5 kW** liquid cooling 1 5/8" input **≤ 7 kW** liquid cooling 3 1/8" input **≤ 12.5 kW** @ 0 - 500 m **≤ 10 kW** @ 2000 m **≤ 8 kW** @ 3200 m	natural cooling **≤ 4 kW** liquid cooling 1 5/8" input **≤ 7 kW** liquid cooling 3 1/8" input **≤ 10 kW** @ 0 - 500 m **≤ 8 kW** @ 2000 m **≤ 6 kW** @ 3400 m	natural cooling **≤ 4.5 kW** liquid cooling 1 5/8" input **≤ 7 kW** liquid cooling 3 1/8" input **≤ 10 kW** @ 0 - 500 m **≤ 8 kW** @ 2000 m **≤ 6 kW** @ 3400 m
Tuning instruction	AS6194	AS6185	AS6290
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.20 dB ≤ 0.35 dB $f_0 \pm 3.805$ ≤ 0.60 dB ≤ 0.90 dB $f_0 \pm 3.885$ ≤ 0.75 dB ≤ 1.05 dB $f_0 \pm 4.2$ ≥ 4 dB $f_0 \pm 6.0$ ≥ 20 dB $f_0 \pm 12.0$ ≥ 40 dB	470 MHz 803 MHz f_0 ≤ 0.3 dB ≤ 0.45 dB $f_0 \pm 2.79$ ≤ 0.9 dB ≤ 1.30 dB $f_0 \pm 3.00$ ≥ 4 dB $f_0 \pm 3.15$ ≥ 8 dB $f_0 \pm 4.5$ ≥ 23 dB $f_0 \pm 9.0$ ≥ 48 dB $f_0 \pm 15.0$ ≥ 50 dB	470 MHz 820 MHz f_0 ≤ 0.20 dB ≤ 0.30 dB $f_0 \pm 3.2$ ≤ 0.35 dB ≤ 0.45 dB $f_0 \pm 4.2$ ≥ 13 dB $f_0 \pm 10.5$ ≥ 38 dB
VSWR (pass band range)	≤ 1.15	≤ 1.15	≤ 1.15
Group delay variation	Δτ ≤ 350 ns	Δτ ≤ 500 ns	Δτ ≤ 150 ns
Temperature stability	≤ 2 kHz / K		
Dimensions (L x W x H) mm	671 x 450 x 440		666 x 450 x 440 BN 61 65 50 C0020 671 x 450 x 440 BN 61 65 50 C0021 690 x 450 x 440 BN 61 65 50 C0022
Weight	ca. 47 kg		ca. 56 kg
Coolant / Flow rate	–		mix: glycol and water BN 15 45 67 / ≥ 3 l/min
Temperature of the coolant	–		20 °C - 60 °C
Cooling interface	–		for hose with inner width 3/4"
Material of cooling	–		stainless steel pipe
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

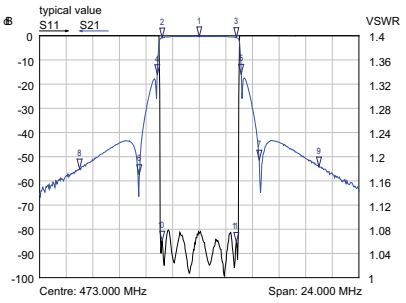
Data subject to change without notice – Edition E

3.2 KW - 12.5 KW UHF DTV BANDPASS FILTER

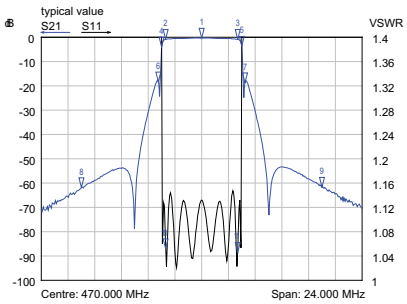
- mask filter for DTV and ATV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within the whole UHF range
- temperature compensated
- installation horizontally or vertically
- DC block
- natural or liquid cooling



Typical diagram AS8067



Typical diagram AS8074

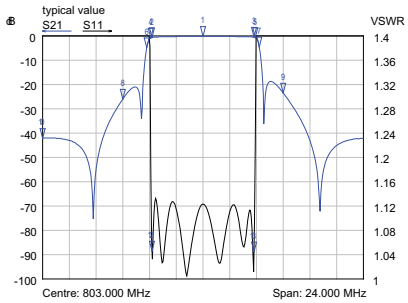


Typical diagram AS8066

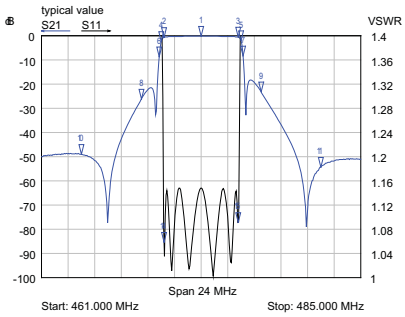
Part number / Connectors	**BN 61 65 44 C0010 1 5/8" EIA**		**BN 61 65 54 C0020 3 1/8" SMS unflanged** **BN 61 65 54 C0021 1 5/8" EIA** **BN 61 65 54 C0022 3 1/8" EIA male**
Cooling	**natural cooling**		**liquid cooling**
Frequency range	470 - 860 MHz		
Number / Size of cavities	**8 / 200**		
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz		
Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ATSC @ 6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	natural cooling **≤ 4 kW** liquid cooling 1 5/8" input **≤ 7 kW** liquid cooling 3 1/8" input **≤ 12.5 kW** @ 0 - 500 m **≤ 10 kW** @ 2000 m **≤ 8 kW** @ 3200 m	natural cooling **≤ 3.2 kW** liquid cooling 1 5/8" input **≤ 7 kW** liquid cooling 3 1/8" input **≤ 10 kW** @ 0 - 500 m **≤ 8 kW** @ 2000 m **≤ 6 kW** @ 3400 m	natural cooling **≤ 3.2 kW** liquid cooling 1 5/8" input **≤ 7 kW** liquid cooling 3 1/8" input **≤ 10 kW** @ 0 - 500 m **≤ 8 kW** @ 2000 m **≤ 6 kW** @ 3400 m
Tuning instruction	AS8067	AS8074	AS8066
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 860 MHz f_0 ≤ 0.3 dB ≤ 0.4 dB $f_0 \pm 3.805$ ≤ 0.9 dB ≤ 1.3 dB $f_0 \pm 3.885$ ≤ 1.4 dB ≤ 1.6 dB $f_0 \pm 4.2$ ≥ 15 dB $f_0 \pm 6.0$ ≥ 40 dB $f_0 \pm 12.0$ ≥ 55 dB	470 MHz 803 MHz f_0 ≤ 0.35 dB ≤ 0.4 dB $f_0 \pm 2.79$ ≤ 1.10 dB ≤ 1.4 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.5$ ≥ 30 dB $f_0 \pm 9.0$ ≥ 55 dB	470 MHz 820 MHz f_0 ≤ 0.4 dB ≤ 0.45 dB $f_0 \pm 2.69$ ≤ 0.9 dB ≤ 1.20 dB $f_0 \pm 3.00$ ≥ 4 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9.00$ ≥ 64 dB
VSWR (pass band range)	≤ 1.10	≤ 1.09	≤ 1.10
Group delay variation	Δτ ≤ 700 ns	Δτ ≤ 500 ns	Δτ ≤ 400 ns
Temperature stability	≤ 2 kHz / K		
Dimensions (L x W x H) mm	874 x 450 x 440		869 x 450 x 440 BN 61 65 54 C0020 874 x 450 x 440 BN 61 65 54 C0021 943 x 450 x 440 BN 61 65 54 C0022
Weight	ca. 59 kg		ca. 64 kg
Coolant / Flow rate	–		mix: glycol and water BN 15 45 67 / ≥ 3 l/min
Temperature of the coolant	–		20 °C - 60 °C
Cooling interface	–		for hose with inner width 3/4"
Material of cooling	–		stainless steel pipe
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		

6.75 KW - 18 KW UHF DTV BANDPASS FILTER

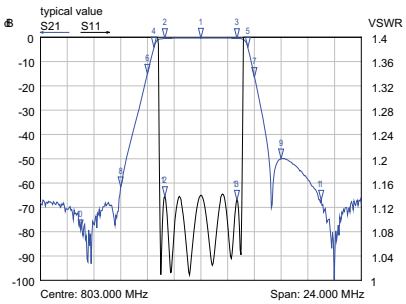
- mask filter for DTV and ATV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within the whole UHF range
- temperature compensated
- installation horizontally or vertically
- DC block
- natural or liquid cooling



Typical diagram AS6303



Typical diagram AS6365



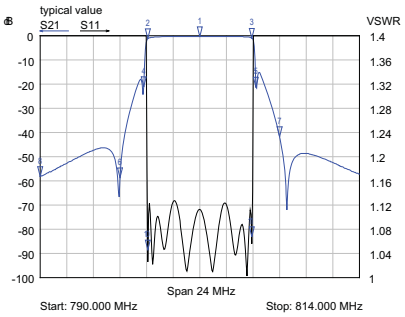
Typical diagram AS6308

Part number / Connectors **Cooling**	**BN 61 66 69 C1041 3 1/8" SMS unflanged** **BN 61 66 69 C1043 3 1/8" EIA** **natural cooling**			**BN 61 66 69 C2041 3 1/8" SMS unflanged** **BN 61 66 69 C2043 3 1/8" EIA** **liquid cooling**		
Frequency range	470 - 790 MHz					
Number / Size of cavities	**6 / 230**					
Harmonics attenuation	≥ 50 dB for f ≤ 800 MHz					
Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB)			ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$ = 13 dB)			ATSC @ 6 MHz ($\hat{U}/U_{rms}$ = 11 dB)		
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	natural cooling **≤ 8.5 kW** liquid cooling **≤ 18 kW** @ 0 - 500 m **≤ 16 kW** @ 1400 m **≤ 14 kW** @ 2200 m **≤ 12 kW** @ 3000 m **≤ 10 kW** @ 3800 m			natural cooling **≤ 6.75 kW** liquid cooling **≤ 15 kW** @ 0 - 500 m **≤ 14 kW** @ 1000 m **≤ 12 kW** @ 2000 m **≤ 10 kW** @ 3000 m **≤ 8 kW** @ 4000 m			natural cooling **≤ 6.75 kW** liquid cooling **≤ 18 kW** @ 0 - 500 m **≤ 16 kW** @ 1400 m **≤ 14 kW** @ 2200 m **≤ 12 kW** @ 3000 m **≤ 10 kW** @ 3800 m		
Tuning instruction	AS6303			AS6365			AS6308		
Insertion loss & Mask filtering (alternative tuning on request)		470 MHz	790 MHz		470 MHz	790 MHz		470 MHz	790 MHz
	f_0	≤ 0.20 dB	≤ 0.30 dB	f_0	≤ 0.30 dB	≤ 0.35 dB	f_0	≤ 0.35 dB	≤ 0.40 dB
	$f_0 \pm 3.805$	≤ 0.65 dB	≤ 0.80 dB	$f_0 \pm 2.79$	≤ 0.75 dB	≤ 0.90 dB	$f_0 \pm 2.69$	≤ 0.70 dB	≤ 0.70 dB
	$f_0 \pm 3.885$	≤ 0.75 dB	≤ 0.90 dB	$f_0 \pm 3.00$	≥ 2 dB		$f_0 \pm 3.50$	≥ 3 dB	
	$f_0 \pm 4.20$	≥ 4 dB		$f_0 \pm 3.15$	≥ 8 dB		$f_0 \pm 4.00$	≥ 8 dB	
	$f_0 \pm 6.00$	≥ 20 dB		$f_0 \pm 4.50$	≥ 23 dB		$f_0 \pm 6.00$	≥ 30 dB	
	$f_0 \pm 12.0$	≥ 40 dB		$f_0 \pm 9.00$	≥ 48 dB		$f_0 \pm 9.00$	≥ 65 dB	
				$f_0 \pm 15.0$	≥ 50 dB				
VSWR (pass band range)	≤ 1.15			≤ 1.15			≤ 1.15		
Group delay variation	Δτ ≤ 350 ns			Δτ ≤ 500 ns			Δτ ≤ 200 ns		
Temperature stability	≤ 2 kHz / K								
Dimensions (L x W x H) mm	775 x 570 x 352 BN 61 66 69 C1041 798 x 570 x 352 BN 61 66 69 C1043			781 x 570 x 352 BN 61 66 69 C2041 804 x 570 x 352 BN 61 66 69 C2043					
Weight	ca. 55 kg								
Coolant / Flow rate	–			mix: glycol and water BN 15 45 67 / ≥ 3 l/min					
Temperature of the coolant	–			10 °C - 55 °C					
Cooling interface	–			stainless steel tube 12 mm x 1 mm unflanged					
Cooling accessories	–			see page annex					
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“								

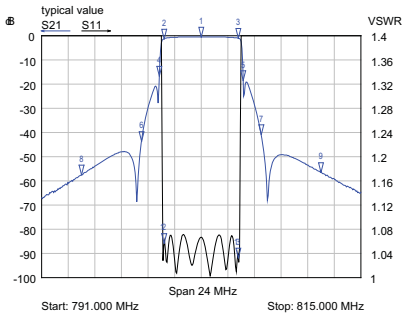
Data subject to change without notice – Edition E

8.5 KW - 16.5 KW UHF DTV BANDPASS FILTER

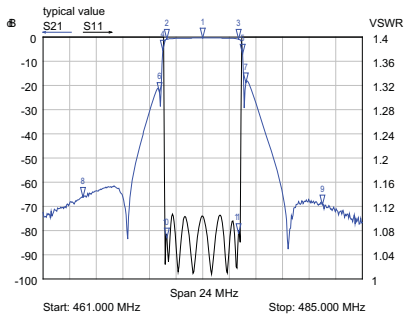
- mask filter for DTV and ATV
- for 6, 7 and 8 MHz channel bandwidth
- with cross coupling (notch function)
- tuneable within the whole UHF range
- temperature compensated
- installation horizontally or vertically
- DC block
- natural or liquid cooling



Typical diagram AS8124



Typical diagram AS8128

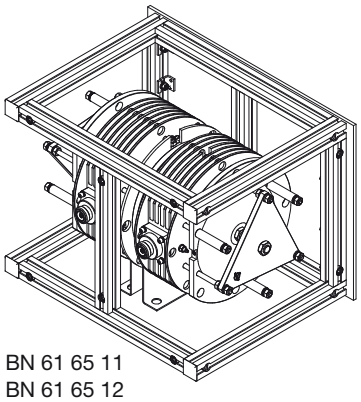


Typical diagram AS8127

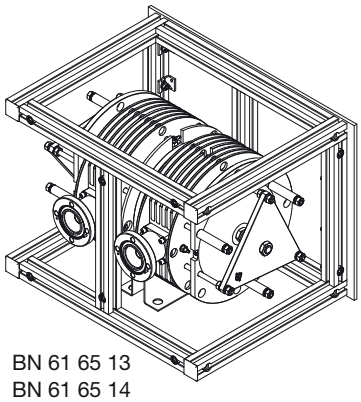
Part number / Connectors **Cooling**	**BN 61 66 70 C1041 3 1/8" SMS unflanged** **BN 61 66 70 C1043 3 1/8" EIA** **natural cooling**	**BN 61 66 70 C2041 3 1/8" SMS unflanged** **BN 61 66 70 C2043 3 1/8" EIA** **liquid cooling**
Frequency range	470 - 790 MHz	
Number / Size of cavities	**8 / 230**	
Harmonics attenuation	≥ 50 dB for f ≤ 860 MHz	
Mask filtering	DVB-T @ 8 MHz ($\hat{U}/U_{rms}$ = 13 dB)	ISDB-T @ 6 MHz ($\hat{U}/U_{rms}$ = 13 dB) / ATSC @ 6 MHz ($\hat{U}/U_{rms}$ = 11 dB)
Average input power The input power of liquid cooled filters must be reduced if installed more than 500 m above sea level.	natural cooling **≤ 8.5 kW** liquid cooling **≤ 16.5 kW** @ 0 - 500 m **≤ 14 kW** @ 1600 m **≤ 12 kW** @ 2400 m **≤ 10 kW** @ 3400 m **≤ 8 kW** @ 4200 m	natural cooling **≤ 6.75 kW** liquid cooling **≤ 13.5 kW** @ 0 - 500 m **≤ 12 kW** @ 1200 m **≤ 10 kW** @ 2400 m **≤ 8 kW** @ 3400 m **≤ 6 kW** @ 4600 m
Tuning instruction	AS8124	AS8128 / AS8127
Insertion loss & Mask filtering (alternative tuning on request)	470 MHz 790 MHz f_0 ≤ 0.30 dB ≤ 0.30 dB $f_0 \pm 3.805$ ≤ 0.95 dB ≤ 1.00 dB $f_0 \pm 3.885$ ≤ 1.15 dB ≤ 1.25 dB $f_0 \pm 4.20$ ≥ 15 dB $f_0 \pm 6.00$ ≥ 40 dB $f_0 \pm 12.0$ ≥ 55 dB	470 MHz 790 MHz f_0 ≤ 0.35 dB ≤ 0.40 dB $f_0 \pm 2.79$ ≤ 1.05 dB ≤ 1.10 dB $f_0 \pm 3.15$ ≥ 15 dB $f_0 \pm 4.50$ ≥ 30 dB $f_0 \pm 9.00$ ≥ 55 dB $f_0 \pm 15.0$ ≥ 65 dB 470 MHz 790 MHz f_0 ≤ 0.35 dB ≤ 0.40 dB $f_0 \pm 2.69$ ≤ 0.90 dB ≤ 1.00 dB $f_0 \pm 3.00$ ≥ 4 dB $f_0 \pm 3.25$ ≥ 18 dB $f_0 \pm 9.00$ ≥ 64 dB
VSWR (pass band range)	≤ 1.15	≤ 1.085 / ≤ 1.15
Group delay variation	Δτ ≤ 700 ns	Δτ ≤ 550 ns / Δτ ≤ 450 ns
Temperature stability	≤ 2 kHz / K	
Dimensions (L x W x H) mm	1006 x 570 x 352 BN 61 66 70 C1041 1030 x 570 x 352 BN 61 66 70 C1043	1006 x 570 x 352 BN 61 66 70 C2041 1030 x 570 x 352 BN 61 66 70 C2043
Weight	ca. 72 kg	
Coolant / Flow rate	–	mix: glycol and water BN 15 45 67 / ≥ 3 l/min
Temperature of the coolant	–	10 °C - 55 °C
Cooling interface	–	stainless steel tube 12 mm x 1 mm unflanged
Cooling accessories	–	see page annex
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

1.2 KW - 1.6 KW BAND L DAB/T-DMB BANDPASS FILTER

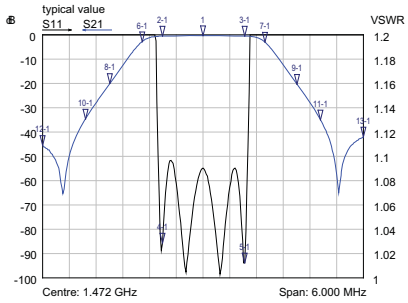
- mask filter for DAB and T-DMB
- for 1,54 MHz block bandwidth
- with cross coupling (notch function)
- temperature compensated
- dual mode technique
- mounted in 19” drawer
- DC block



BN 61 65 11
BN 61 65 12



BN 61 65 13
BN 61 65 14



Typical diagram AS4040

Part number **Connectors**	**BN 61 65 11** **7-16 female**	**BN 61 65 13** **1 5/8" EIA**	**BN 61 65 12** **7-16 female**	**BN 61 65 14** **1 5/8" EIA**
Frequency range	1452 - 1468 MHz		1468 - 1492 MHz	
Number / Size of cavities	**4 / DM**			
Mask filtering	DAB / T-DMB @ 1.54 MHz (Ü/Urms=13 dB)			
Average input power	**≤ 1.2 kW 7-16 female** **≤ 1.6 kW 1 5/8" EIA**			
Tuning instruction	AS4040			
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.50 dB $f_0 \pm 0.77$ ≤ 0.65 dB $f_0 \pm 0.97$ ≥ 0.80 dB $f_0 \pm 1.15$ ≥ 1.5 dB $f_0 \pm 1.75$ ≥ 12 dB $f_0 \pm 2.20$ ≥ 26 dB $f_0 \pm 3.00$ ≥ 40 dB			
VSWR (pass band range)	≤ 1.10			
Group delay variation	$\Delta\tau \leq 110$ ns			
Temperature stability	≤ 1.5 kHz / K			
Dimensions (L x W x H) mm	483 x 355 x 360			
Weight	ca. 25 kg		ca. 30 kg	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			

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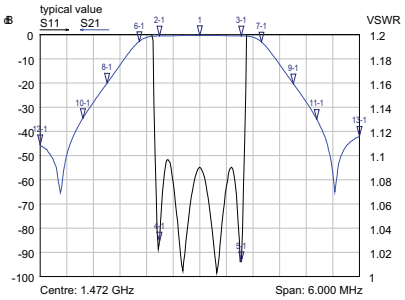
400 W BAND L DAB/T-DMB BANDPASS FILTER

- mask filter for DAB and T-DMB
- for 1.54 MHz block bandwidth
- with cross coupling (notch function)
- temperature compensated
- dielectric resonators
- installation vertically or horizontally
- DC block



Typical diagram AS4039

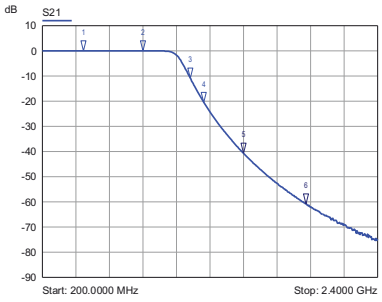
Part number	**BN 61 65 16**
Frequency range	1452 - 1492 MHz
Number / Size of cavities	**4 / DE**
Mask filtering	DAB / T-DMB @ 1.54 MHz ($\hat{U}/U_{rms}$ = 13 dB)
Average input power	**≤ 300 W** **≤ 400 W with forced air cooling**
Tuning instruction	AS4039
Insertion loss & Mask filtering (alternative tuning on request)	f_0 ≤ 0.45 dB $f_0 \pm 0.77$ ≤ 0.55 dB $f_0 \pm 0.97$ ≥ 0.70 dB $f_0 \pm 1.15$ ≥ 1.50 dB $f_0 \pm 1.75$ ≥ 12.0 dB $f_0 \pm 2.20$ ≥ 26.0 dB $f_0 \pm 3.00$ ≥ 40.0 dB
VSWR (pass band range)	≤ 1.10
Group delay variation	$\Delta\tau \leq 150$ ns
Temperature stability	≤ 3 kHz / K
Connectors	7-16 female
Dimensions (L x W x H) mm	198 x 183 x 95
Weight	ca. 5 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“

1.2 KW - 2 KW LOW PASS FILTER

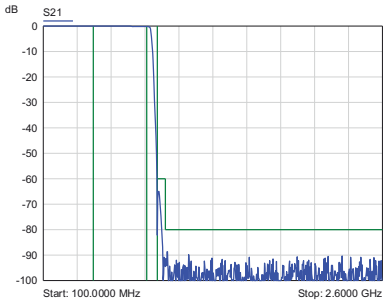
- low-pass filter for suppression of harmonics
- compact design
- low attenuation in pass band

BN 61 63 95

BN 61 64 52 C0011



Typical diagram



Typical diagram

Part number	**BN 61 63 95**	**BN 61 64 52 C0011**
Pass band	330 - 960 MHz	470 - 860 MHz
Average input power	**≤ 1 kW**	**≤ 2 kW**
Pass band insertion loss	390 - 960 MHz ≤ 0.1 dB	470 - 800 MHz ≤ 0.10 dB 800 - 860 MHz ≤ 0.18 dB
Stop band attenuation	1.170 GHz ≥ 10 dB 1.260 GHz ≥ 20 dB 1.520 GHz ≥ 30 dB 1.930 GHz ≥ 40 dB	0.94 - 1.0 GHz ≥ 60 dB 1.00 - 2.6 GHz ≥ 80 dB
VSWR (pass band range)	≤ 1.2	470 - 800 MHz ≤ 1.06 800 - 860 MHz ≤ 1.10
Group delay variation	$\Delta\tau \leq 1$ ns	$\Delta\tau \leq 20$ ns
Proof voltage	3.5 kV	470 - 800 MHz 3.5 kV 800 - 860 MHz 1.6 kV
Connectors	7-16 female / 7-16 male	7-16 female
Dimensions (L x W x H) mm	174 x 32 x 32	406 x 80 x 80
Weight	ca. 0.6 kg	ca. 2.0 kg
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

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ACCESSORIES FOR LIQUID COOLED FILTERS

SPINNER offers many options for the implementation of liquid cooled filters to either existing cooling systems or independent combiner cooling systems with heat sinks:

- various interfaces for cooling pipes
- temperature switch for alarm or switch-off
- cooler unit with heat sinks

Pump unit and UHF combiner with liquid cooled filter

Pump unit and indoor cooler

Cutting ring fittings to interface the cooling tube	**Part number**
Tube fitting hose barb connector 1/2”	BN A7 29 55
Tube fitting gauge connector 3/8" female straight	BN A7 42 62
Tube fitting gauge connector 3/8" male straight	BN A7 42 63
Tube fitting gauge connector 3/8" female 90° elbow	BN A7 43 18
Tube fitting gauge connector 3/8" male 90° elbow	BN A7 43 20
Tube fitting gauge connector 1/2" female straight	BN A7 42 60
Tube fitting gauge connector 1/2" male straight	BN A7 42 61
Tube fitting gauge connector 1/2" female 90° elbow	BN A7 43 17
Tube fitting gauge connector 1/2" male 90° elbow	BN A7 43 19
Temperature switch for alarm or switch-off	
Normally closed contact opening at 85°C	BN B1 81 00
Coolant	
25 l can with coolant (mix glycol and water and anti corrosive)	BN 15 45 67
Cooler	
Cooling unit with reservoir, twin pump, water splitter, valves	BN 15 57 29

UMSCHALTFELDER
PATCH PANELS

Umschaltfelder werden eingesetzt, um Sender auf Einzelantennen, Halbantennen, Reserveantennen oder Kunstantennen zu schalten oder zwischengeschaltete Systeme wie z.B. Combiner oder Verteiler zu umgehen.

Die Umschaltung kann manuell mit Bügelsteckern oder mit Motorschaltern erfolgen. Alle Umschaltfelder verfügen über ein Interlock-System zur Senderabschaltung während des Umschaltvorganges.

Alle Anschlüsse (Eingang / Ausgang) enden unmittelbar hinter der Frontplatte horizontal mit EIA Flansch System.

Die am Umschaltfeld angeschlossenen Systeme können mittels Messübergängen einfach, schnell und präzise vermessen werden.

SPINNER liefert Umschaltfelder für alle Frequenzbereiche und Leitungsgrößen (7-16 bis 6 1/8"). Auf Kundenwunsch können Umschaltfelder auch mit 3dB Kopplern als 2-fach Verteiler und mit Messrichtkopplern ausgerüstet werden.

Anmerkung:
Bei Betrieb mit digitalen Signalen wird die übertragbare Leistung entweder durch die Prüfspannung, unter Einbeziehung des Crestfaktors, oder durch die effektive Leistung begrenzt.
Bei Mehrsenderbetrieb ist die Summe der Einzelspannungen zu berücksichtigen. Letzteres gilt auch für Analog-Betrieb. Alle Leistungsangaben gelten bei +40 °C Umgebungstemperatur.

Patch panels are used for routing transmitter signals to single, half, backup antennas, or dummy loads or for bypassing intermediate systems such as combiners or splitters.

The switchover can be carried out with motor switches or manually with U-links. All patch panels have an interlock system that switches off the transmitter during the switchover.

All input / output connectors are ending horizontal with EIA flange system behind the front panel.

The systems connected to the patch panel can be measured easily, quickly and precisely using measuring adapters.

SPINNER delivers patch panels for all frequency ranges and sizes (7-16 through 6 1/8"). Upon customer request the patch panels can also be equipped with 3dB couplers used as power splitters and with measurement couplers.

Note:
For digital signal operation please note that the transmittable power is limited either by the proof voltage, taking the crest factor into account, or by the average power.

For multitransmitter operation please consider the sum of the individual voltages. The same applies to analogue operating mode. All power figures refer to an ambient temperature of +40 °C.

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UMSCHALTFELDER
PATCH PANELS

3 PORT UMSCHALTFELD
3 PORT PATCH PANEL

Bestellnummer Part number	Anschlüsse Connectors	Effektive Eingangsleistung Average input power			Frequenzbereich Frequency range
		100 MHz	240 MHz	860 MHz	
BN 54 71 71 **BN 54 71 71 C0101**	7-16 f	≤ 5 kW	≤ 3.5 kW	≤ 2 kW	0 - 860 MHz
BN 55 31 82 **BN 55 31 82 C0101**	1 5/8" EIA	≤ 20 kW	≤ 13.5 kW	≤ 7 kW	0 - 860 MHz
BN 55 34 31 **BN 55 34 31 C0101**	3 1/8" EIA	≤ 51 kW	≤ 34 kW	≤ 17.5 kW	0 - 860 MHz

4 PORT UMSCHALTFELD
4 PORT PATCH PANEL

Bestellnummer Part number	Anschlüsse Connectors	Effektive Eingangsleistung Average input power			Frequenzbereich Frequency range
		100 MHz	240 MHz	860 MHz	
BN 54 71 74 **BN 54 71 74 C0101**	7-16 f	≤ 5 kW	≤ 3.5 kW	≤ 2 kW	0 - 860 MHz
BN 55 32 26 **BN 55 32 26 C0101**	1 5/8" EIA	≤ 20 kW	≤ 13.5 kW	≤ 7 kW	0 - 860 MHz
BN 55 35 14 **BN 55 35 14 C0101**	3 1/8" EIA	≤ 51 kW	≤ 34 kW	≤ 17.5 kW	0 - 860 MHz
BN 55 38 02 **BN 55 38 02 C0101**	4 1/2" EIA [1)]	≤ 98 kW	≤ 67 kW	≤ 35 kW	0 - 860 MHz
BN 55 32 29 C0001	1 5/8" EIA	≤ 20 kW	≤ 13.5 kW	≤ 7 kW	0 - 860 MHz
BN 55 35 67	3 1/8" EIA	≤ 51 kW	≤ 34 kW	≤ 17.5 kW	0 - 860 MHz
BN 55 38 72	4 1/2" EIA [1)]	≤ 82 kW	≤ 42 kW	≤ 28 kW	0 - 860 MHz

6 PORT UMSCHALTFELD
6 PORT PATCH PANEL

Bestellnummer Part number	Anschlüsse Connectors	Effektive Eingangsleistung Average input power			Frequenzbereich Frequency range
		100 MHz	240 MHz	860 MHz	
BN 55 32 83 A0200	1 5/8" EIA	≤ 20 kW			87 - 108 MHz
BN 55 34 72 A0200	3 1/8" EIA	≤ 51 kW			87 - 108 MHz
BN 55 38 88 A0200	4 1/2" EIA [1)]	≤ 98 kW			87 - 108 MHz
BN 54 06 58 A0200	6 1/8" EIA	≤ 140 kW			87 - 108 MHz
BN 55 32 84	1 5/8" EIA		≤ 13.5 kW		170 - 240 MHz
BN 55 35 78	3 1/8" EIA		≤ 34 kW		170 - 240 MHz
BN 55 32 85 **BN 55 32 82**	1 5/8" EIA			≤ 7 kW	470 - 860 MHz
BN 55 35 79 **BN 55 35 76**	3 1/8" EIA			≤ 17.5 kW	470 - 860 MHz
BN 55 38 81 A0200	4 1/2" EIA [1)]			≤ 35 kW	470 - 860 MHz
BN 54 06 42 A0200	6 1/8" EIA			≤ 47 kW	470 - 860 MHz
BN 54 06 52 A0200	6 1/8" EIA			≤ 60 kW	470 - 860 MHz
BN 54 06 43 A0200	6 1/8" EIA			≤ 80 kW	470 - 800 MHz

Bügelstecker und Messübergänge **U-Links and measurement adaptors**

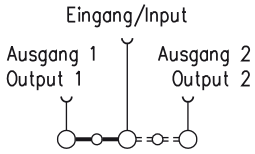
[1)] 339 IEC 50-105

3 PORT UMSCHALTFELDER
3 PORT PATCH PANELS

- 19"-Frontplatte
- Interlock Anschlussleiste frontseitig zugänglich, oder Slim design in reduzierter Höhe, Interlock Anschlussleiste nicht montiert, im Lieferumfang enthalten
- Bügelstecker mit Interlock-System 1 (IL 1-4)
- Messmöglichkeit auf der Frontplatte

- 19" front panel
- access to the interlock terminal strip from the front side, or slim design with reduced high, interlock terminal strip is not installed, included in the package
- U-links with interlock system 1 (IL 1-4)
- measurement at the front possible

Bestellnummer Part number	**BN 54 71 71 standard BN 54 71 71 C0101 slim design**	**BN 55 31 82 C0101 standard BN 55 31 82 slim design**	**BN 55 34 31 standard BN 55 34 31 C0101 slim design**
Frequenzbereich Frequency range		0 - 860 MHz	
Prüfspannung Proof voltage	≤ 2.7 kV	≤ 10 kV	≤ 13 kV
Effektive Leistung 100 MHz Average power 240 MHz 860 MHz	≤ 5.0 kW ≤ 3.5 kW ≤ 2.0 kW	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW	≤ 51.0 kW ≤ 34.0 kW ≤ 17.5 kW
Durchgangsdämpfung Insertion loss		≤ 0.1 dB	
VSWR		≤ 1.04	
Umschaltgröße Switching port size	7-16 Kuppler 7-16 female	1 5/8" USL-D	29.5-68 USL-D
Anschlüsse Eingang / Ausgang Input / Output connectors	7-16 Kuppler 7-16 female	1 5/8" EIA	3 1/8" EIA
Anzahl der Interlock-Kontakte Number of interlock contacts		4	
Belastbarkeit der Interlock-Kontakte Rating of the interlock contacts max. Spannung max. Voltage max. Strom max. Current		≤ 60.0 V DC ≤ 42.4 V AC_{pk} ≤ 0.75 A	
Abmessungen (H x B x T) mm Dimensions (H x W x D) mm	**BN 54 71 71** 266 x 483 x 35 **BN 54 71 71 C0101** 132 x 483 x 15	**BN 55 31 82 C0101** 309 x 483 x 65 **BN 55 31 82** 177 x 483 x 65	**BN 55 34 31** 444 x 483 x 115 **BN 55 34 31 C0101** 310 x 483 x 115
Gewicht Weight	ca. 3.6 kg	ca. 6.0 kg	ca. 9.6 kg
Gestell Rack		nein / no	
Zubehör / Accessories			
Messübergänge Measurement adaptors		Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors	
Environmental conditions		for limitations see „Environmental Conditions for Broadcast Products“	



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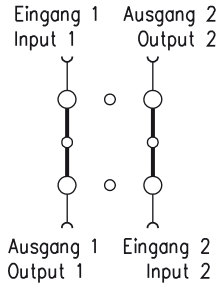
4 PORT UMSCHALTFELDER
4 PORT PATCH PANELS

- 19"-Frontplatte
- Interlock Anschlussleiste frontseitig zugänglich, oder Slim design in reduzierter Höhe, Interlock Anschlussleiste nicht montiert, im Lieferumfang enthalten
- Bügelstecker mit Interlock-System 1 (IL 1-4)
- Messmöglichkeit auf der Frontplatte

- 19" front panel
- access to the interlock terminal strip from the front side, or slim design with reduced high, interlock terminal strip is not installed, included in the package
- U-links with interlock system 1 (IL 1-4)
- measurement at the front possible

Bestellnummer Part number	**BN 54 71 74 standard BN 54 71 74 C0101 slim design**	**BN 55 32 26 standard BN 55 32 26 C0101 slim design**
Frequenzbereich Frequency range	0 - 860 MHz	
Prüfspannung Proof voltage	≤ 2.7 kV	≤ 10 kV
Effektive Leistung 100 MHz Average power 240 MHz 860 MHz	≤ 5.0 kW ≤ 3.5 kW ≤ 2.0 kW	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW
Durchgangsdämpfung Insertion loss	≤ 0.1 dB	
VSWR	≤ 1.04	
Umschaltgröße Switching port size	7-16 f	1 5/8" USL-D
Anschlüsse Eingang / Ausgang Input / Output connectors	7-16 f	1 5/8" EIA
Anzahl der Interlock-Kontakte Number of interlock contacts	4	
Belastbarkeit der Interlock-Kontakte Rating of the interlock contacts max. Spannung max. Voltage max. Strom max. Current	≤ 60.0 V DC ≤ 42.4 V AC_{pk} ≤ 0.75 A	
Abmessungen (H x B x T) mm Dimensions (H x W x D) mm	**BN 54 71 74** 310 x 483 x 35 **BN 54 71 74 C0101** 221 x 483 x 15	**BN 55 32 26** 444 x 483 x 65 **BN 55 32 26 C0101** 310 x 483 x 65
Gewicht Weight	4.6 kg	8.5 kg
Gestell Rack	nein / no	
Zubehör / Accessories		
Messübergänge Measurement adaptors	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	

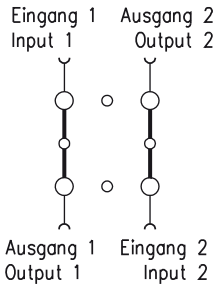


4 PORT UMSCHALTFELDER
4 PORT PATCH PANELS

- 19"-Frontplatte
- Interlock Anschlussleiste frontseitig zugänglich, oder Slim design in reduzierter Höhe, Interlock Anschlussleiste nicht montiert, im Lieferumfang enthalten
- Bügelstecker mit Interlock-System 1 (IL 1-4)
- Messmöglichkeit auf der Frontplatte

- 19" front panel
- access to the interlock terminal strip from the front side, or slim design with reduced high, interlock terminal strip is not installed, included in the package
- U-links with interlock system 1 (IL 1-4)
- measurement at the front possible

Bestellnummer Part number		**BN 55 35 14 standard BN 55 35 14 C0101 slim design**	**BN 55 38 02 standard BN 55 38 02 C0101 slim design**
Frequenzbereich Frequency range		0 - 860 MHz	
Prüfspannung Proof voltage		≤ 13 kV	≤ 19 kV
Effektive Leistung Average power	100 MHz 240 MHz 860 MHz	≤ 51.0 kW ≤ 34.0 kW ≤ 17.5 kW	≤ 98 kW ≤ 67 kW ≤ 35 kW
Durchgangsdämpfung Insertion loss		≤ 0.1 dB	
VSWR		≤ 1.04	
Umschaltgröße Switching port size		29.5-68 USL-D	43-98 USL-D
Anschlüsse Eingang / Ausgang Input / Output connectors		3 1/8" EIA	4 1/2" EIA 339 IEC 50-105
Anzahl der Interlock-Kontakte Number of interlock contacts		4	
Belastbarkeit der Interlock-Kontakte Rating of the interlock contacts			
	max. Spannung max. Voltage	≤ 60.0 V DC ≤ 42.4 V AC_{pk}	
	max. Strom max. Current	≤ 0.75 A	
Abmessungen (H x B x T) mm Dimensions (H x W x D) mm		**BN 55 35 14** 444 x 483 x 115 **BN 55 35 14 C0101** 310 x 483 x 115	**BN 55 38 02** 666 x 483 x 105 **BN 55 38 02 C0101** 532 x 483 x 105
Gewicht Weight		11 kg	22 kg
Gestell Rack		nein / no	
Zubehör / Accessories			
Messübergänge Measurement adaptors		Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors	
Environmental conditions		for limitations see „Environmental Conditions for Broadcast Products“	



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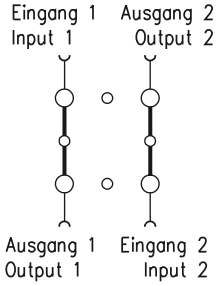
4 PORT UMSCHALTFELDER
4 PORT PATCH PANELS

- 19"-Frontplatte
- für Motor Aufsteckschalter
- Überbrückungsmöglichkeit mit Bügelsteckern (IL 1-4)
- Messmöglichkeit auf der Frontplatte

- 19" front panel
- for plug-in switch
- bridging with U-links (IL 1-4)
- measurement at the front possible

Bestellnummer Part number	**BN 55 32 29 C0001**	**BN 55 35 67**	**BN 55 38 72**
Frequenzbereich Frequency range	0 - 860 MHz		
Prüfspannung, begrenzt durch Aufsteckschalter Proof voltage, limited by plug-in switch	≤ 7 kV	≤ 8.1 kV	≤ 12.5 kV
Effektive Leistung 100 MHz Average power 240 MHz 860 MHz	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW	≤ 41 kW ≤ 21 kW ≤ 14 kW	≤ 82 kW ≤ 42 kW ≤ 28 kW
Durchgangsdämpfung Insertion loss	≤ 0.1 dB		
VSWR	≤ 1.04		
Umschaltgröße Switching port size	1 5/8" USL-D	29.5-68 USL-D	43-98 USL-D
Anschlüsse Eingang / Ausgang Input / Output connectors	1 5/8" EIA	3 1/8" EIA	4 1/2" EIA 339 IEC 50-105
Anzahl der Interlock-Kontakte Number of interlock contacts	4		
Belastbarkeit der Interlock-Kontakte Rating of the interlock contacts max. Spannung max. Voltage max. Strom max. Current	≤ 60.0 V DC ≤ 42.4 V AC_{pk} ≤ 0.75 A		
Abmessungen (H x B x T) mm Dimensions (H x W x D) mm	355 x 483 x 65	400 x 483 x 115	533 x 483x 105
Gewicht Weight	ca. 9.5 kg	ca. 11 kg	ca. 23 kg
Gestell Rack	nein / no		
Zubehör / Accessories			
Aufsteckschalter Plug-in switch	BN 55 30 64 BN 55 30 65	BN 55 33 64 BN 55 33 65	BN 55 36 64 BN 55 36 65
19"-Frontplatte mit 4 Parkbuchsen 19" front panel with 4 parking sockets	BN 55 32 51	BN 55 34 01	BN 55 37 49
Bügelstecker Standard U-link standard	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors		
Bügelstecker mit gleicher elektrischer Länge wie Aufsteckschalter U-link with identical electrical length as plug-in switch	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors		
Messübergänge Measurement adaptors	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors		
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		



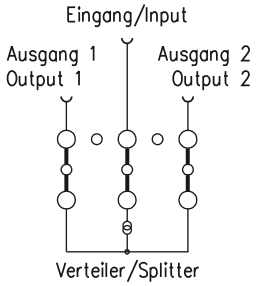
6 PORT UMSCHALTFELDER (FM)

6 PORT PATCH PANELS (FM)

- offenes Rahmengestell
- Interlock Anschlussleiste frontseitig zugänglich
- inklusive symmetrischem 2-fach Verteiler
- Bügelstecker mit Interlock-System 2 (IL 2-10)
- Messmöglichkeit auf der Frontseite

- open rack
- access to the interlock terminal strip from the front side
- symmetrical power splitter included
- U-links with interlock system 2 (IL 2-10)
- measurement at the front possible

Bestellnummer Part number	**BN 55 32 83 A0200**	**BN 55 34 72 A0200**	**BN 55 38 88 A0200**	**BN 54 06 58 A0200**
Frequenzbereich Frequency range	87 - 108 MHz			
Prüfspannung Proof voltage	≤ 10 kV	≤ 13 kV	≤ 19 kV	≤ 23 kV
Effektive Leistung 100 MHz Average power	≤ 20 kW	≤ 51 kW	≤ 98 kW	≤ 132 kW
Durchgangsdämpfung Insertion loss	≤ 0.1 dB			
VSWR	≤ 1.06			
Umschaltgröße Switching port size	1 5/8" USL-D	29.5-68 USL-D	43-98 USL-D	52-120 USL
Anschlüsse Eingang / Ausgang Input / Output connectors	1 5/8" EIA	3 1/8" EIA	4 1/2" EIA 339 IEC 50-105	6 1/8" EIA
Anzahl der Interlock-Kontakte Number of interlock contacts	10			
Belastbarkeit der Interlock-Kontakte Rating of the interlock contacts max. Spannung max. Voltage	≤ 60.0 V DC ≤ 42.4 V AC_{pk}			
max. Strom max. Current	≤ 0.1 A			
Phasengenauigkeit der Ausgänge Phase accuracy of outputs	3°			
Abmessungen (H x B x T) mm Dimensions (H x W x D) mm	1980 x 583 x 600		1980 x 790 x 800	1980 x 990 x 800
Gewicht Weight	ca. 60 kg	ca. 75 kg	ca. 150 kg	ca. 200 kg
Gestell Rack	ja / yes			
Zubehör / Accessories				
Messübergänge Measurement adaptors	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors			
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			



Data subject to change without notice – Edition E

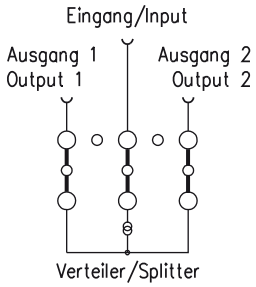
6 PORT UMSCHALTFELDER (VHF)

6 PORT PATCH PANELS (VHF)

- 19"-Frontplatte
- Interlock Anschlussleiste frontseitig zugänglich
- kompakter Aufbau
- inklusive symmetrischem 2-fach Verteiler
- Bügelstecker mit Interlock-System 1(IL 1-4)
- Messmöglichkeit auf der Frontplatte

- 19" front panel
- access to the interlock terminal strip from the front side
- compact design
- symmetrical power splitter included
- U-links with interlock system 1 (IL 1-4)
- measurement at the front possible

Bestellnummer Part number	**BN 55 32 84**	**BN 55 35 78**
Frequenzbereich Frequency range	170 - 240 MHz	
Prüfspannung Proof voltage	≤ 10 kV	≤ 13 kV
Effektive Leistung Average power	≤ 13.5 kW	≤ 34 kW
Durchgangsdämpfung Insertion loss	≤ 0.1 dB	
VSWR	≤ 1.05	
Umschaltgröße Switching port size	1 5/8" USL-D	29.5-68 USL-D
Anschlüsse Eingang / Ausgang Input / Output connectors	1 5/8" EIA	3 1/8" EIA
Anzahl der Interlock-Kontakte Number of interlock contacts	4	
Belastbarkeit der Interlock-Kontakte Rating of the interlock contacts max. Spannung max. Voltage max. Strom max. Current	 ≤ 60.0 V DC ≤ 42.4 V AC_{pk} ≤ 0.75 A	
Phasengenauigkeit Phase accuracy of outputs	3°	
Abmessungen (H x B x T) mm Dimensions (H x W x D) mm	550 x 483 x 307	550 x 483 x 318
Gewicht Weight	ca. 25 kg	ca. 34 kg
Gestell Rack	nein / no	
Zubehör / Accessories		
Messübergänge Measurement adaptors	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	



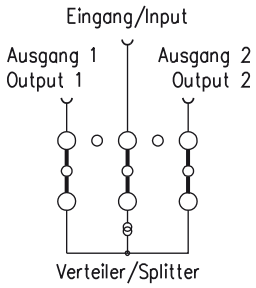
6 PORT UMSCHALTFELDER (UHF)

6 PORT PATCH PANELS (UHF)

- 19"-Frontplatte
- Interlock Anschlussleiste frontseitig zugänglich
- kompakter Aufbau
- inklusive symmetrischem 2-fach Verteiler
- Bügelstecker mit Interlock-System 1 oder 2 (IL 1-4 oder IL 2-10)
- Messmöglichkeit auf der Frontplatte

- 19" front panel
- access to the interlock terminal strip from the front side
- compact design
- symmetrical power splitter included
- U-links with interlock system 1 or 2 (IL 1-4 or 2-10)
- measurement at the front possible

Bestellnummer **Part number**	**BN 55 32 85 IL 1-4** **BN 55 32 82 IL 2-10**	**BN 55 35 79 IL 1-4** **BN 55 35 76 IL 2-10**
Frequenzbereich Frequency range	470 - 860 MHz	
Prüfspannung Proof voltage	≤ 10 kV	≤ 13 kV
Effektive Leistung Average power	≤ 7 kW	≤ 17.5 kW
Durchgangsdämpfung Insertion loss	≤ 0.15 dB	≤ 0.10 dB
VSWR	≤ 1.05	
Umschaltgröße Switching port size	1 5/8" USL-D	29.5-68 USL-D
Anschlüsse Eingang / Ausgang Input / Output connectors	1 5/8" EIA	3 1/8" EIA
Anzahl der Interlock-Kontakte Number of interlock contacts	4 / 10	
Belastbarkeit der Interlock-Kontakte Rating of the interlock contacts max. Spannung max. Voltage max. Strom max. Current	 ≤ 60.0 V DC ≤ 42.4 V AC_{pk} ≤ 0.75 A / 0.1 A	
Phasengenauigkeit Phase accuracy of outputs	3°	
Abmessungen (H x B x T) mm Dimensions (H x W x D) mm	444 x 483 x 260	488 x 483 x 260
Gewicht Weight	ca. 25 kg	ca. 34 kg
Gestell Rack	nein / no	
Zubehör / Accessories		
Messübergänge Measurement adaptors	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors	
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	



Data subject to change without notice – Edition E

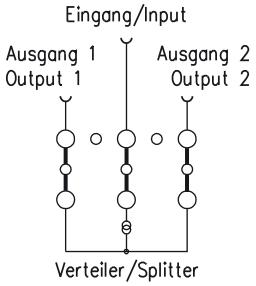
6 PORT UMSCHALTFELDER (UHF)

6 PORT PATCH PANELS (UHF)

- offenes Rahmengestell
- Interlock Anschlussleiste frontseitig zugänglich
- inklusive symmetrischem 2-fach Verteiler
- Bügelstecker mit Interlock-System 2 (IL 2-10)
- Messmöglichkeit auf der Frontseite

- open rack
- access to the interlock terminal strip from the front side
- symmetrical power splitter included
- U-links with interlock system 2 (IL 2-10)
- measurement at the front possible

Bestellnummer Part number	**BN 55 38 81 A0200**	**BN 54 06 42 A0200**	**BN 54 06 52 A0200**	**BN 54 06 43 A0200**
Frequenzbereich Frequency range	470 - 860 MHz			
Prüfspannung Proof voltage	≤ 19 kV	≤ 23 kV	≤ 25 kV	
Effektive Leistung Average power	≤ 35 kW	≤ 47 kW	≤ 60 kW	≤ 80 kW (800 MHz)
Durchgangsdämpfung Insertion loss	≤ 0.1 dB			≤ 0.05 dB
VSWR	≤ 1.05			
Umschaltgröße Switching port size	43-98 USL-D	52-120 USL		6 1/8" USL
Anschlüsse Eingang / Ausgang Input / Output connectors	4 1/2" EIA 339 IEC 50-105	6 1/8" EIA		
Anzahl der Interlock-Kontakte Number of interlock contacts	10			
Belastbarkeit der Interlock-Kontakte Rating of the interlock contacts max. Spannung max. Voltage max. Strom max. Current	≤ 60.0 V DC ≤ 42.4 V AC_{pk} ≤ 0.1 A			
Phasengenauigkeit Phase accuracy of outputs	3°			
Abmessungen (H x B x T) mm Dimensions (H x W x D) mm	1980 x 790 x 900	1980 x 990 x 900		1980 x 1190 x 900
Gewicht Weight	ca. 145 kg	ca. 180 kg		ca. 215 kg
Gestell Rack	ja / yes			
Zubehör / Accessories				
Messübergänge Measurement adaptors	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors			
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“			



BÜGELSTECKER UND MESSÜBERGÄNGE
U-LINKS AND MEASUREMENT ADAPTORS

- schnelles Umschalten
- 4 oder 10 Interlock-Kontakte IL 1-4 oder IL 2-10
- sofort perfekter HF-Kontakt und Schirmung
- beste Wiederholgenauigkeit
- Messübergänge für genaue Messung von Weichen, Speisekabeln und Antennen von der Frontplatte

- fast switching
- 4 or 10 interlock contacts IL1-4 or IL 2-10
- instant RF-connection and shielding
- best repeat accuracy
- measurement adaptors for accurate measurement of combiners, feeders and antennas from front side

Bügelstecker mit Interlock-System 1 (IL 1-4)
U-link with interlock system 1 (IL 1-4)

Bügelstecker mit Interlock-System 2 (IL 2-10)
U-link with interlock system 2 (IL 2-10

Messübergang
Measurement adaptors

Bügelstecker mit Interlock-System 1 (IL 1-4) und 2 (IL 2-10)
U-link with interlock system 1 (IL 1-4) and 2 (2-10)

Bestellnummer **Part number**	**Interlock 1** **Interlock 2**	**BN 54 01 21** **–**	**BN 55 30 31** **BN 55 30 32**	**BN 55 33 31** **BN 55 33 32**	**BN 55 36 11** **BN 55 36 12**	**–** **BN 53 96 27**	**–** **BN 53 96 13**	**–** **BN 53 96 33**
Frequenzbereich Frequency range		0 - 860 MHz						0 - 800 MHz
Prüfspannung Proof voltage		≤ 2.7 kV	≤ 10 kV	≤ 13 kV	≤ 19 kV	≤ 23 kV	≤ 25 kV	≤ 34 kV
Effektive Leistung Average power	100 MHz 240 MHz 860 MHz	≤ 5.0 kW ≤ 3.5 kW ≤ 2.0 kW	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW	≤ 51.0 kW ≤ 34.0 kW ≤ 17.5 kW	≤ 98.0 kW ≤ 67.0 kW ≤ 35.0 kW	≤ 132.0 kW ≤ 91.0 kW ≤ 47.0 kW	≤ 169.0 kW ≤ 116.0 kW ≤ 60.0 kW	≤ 225.0 kW ≤ 154.0 kW ≤ 80.0 kW*
Anschlüsse Connectors		7-16	158 USL-D	68 USL-D	98 USL-D	120 USL	120 USL	618 USL
Achsabstand Distance between axles		110 mm	160 mm	160 mm	225 mm	325 mm	325 mm	400 mm
Gewicht Weight		ca. 0.6 kg	ca. 1 kg	ca. 1.7 kg	ca. 4.7 kg	ca. 9.4 kg	ca. 10 kg	ca. 22 kg
Option								
Bügelstecker mit gleicher elektrischer Länge wie Aufsteckschalter U-link with identical electrical length as plug-in switch			BN 55 30 33	BN 55 33 34	–	–	–	–

*) @ 800MHz

Präzisionsmessübergänge auf 7-16 Kuppler
Precision measurement adaptors to 7-16 female

Bestellnummer **Part number**	–	**BN 55 30 48**	**BN 55 33 48**	**BN 55 36 48**	**BN 53 96 48**	**BN 53 96 47***
Anschlüsse Connectors	–	158 USL-D	68 USL-D	98 USL-D	120 USL	618 USL
VSWR	–	≤ 1.02	≤ 1.02	≤ 1.02	≤ 1.02	≤ 1.02
Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“					

*) @ 800MHz

Data subject to change without notice – Edition E

PARALLELSCHALTEINRICHTUNGEN
PARALLEL SWITCHING UNITS

Mit Parallelschalteinrichtungen werden zwei Sender gleicher Frequenz und 90° Phasendifferenz zur Leistungsverdopplung zusammengeschaltet. Normalerweise reduziert sich bei Ausfall eines Senders die Ausgangsleistung auf 25 % der ursprünglichen Leistung, da die halbe Leistung des intakten Senders in den Brückenabsorber des 3 dB Kopplers fließt.

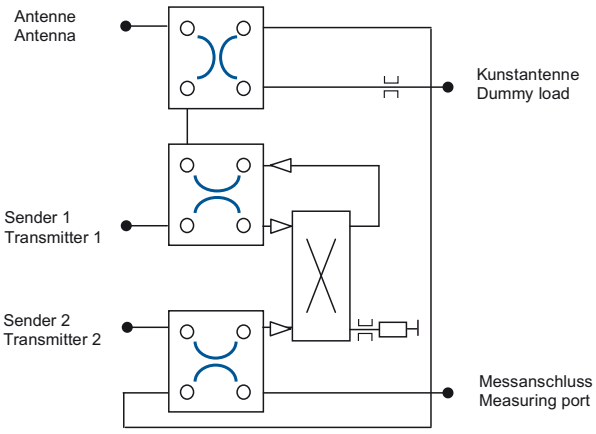
Mit einer SPINNER Parallelschalteinrichtung kann innerhalb von Sekunden Sender 1 oder Sender 2 direkt auf die Antenne und Sender 2 oder Sender 1 auf die Kunstantenne geschaltet werden. Somit stehen wieder 50 % der ursprünglichen Leistungzur Verfügung und am freigeschalteten Sender können Wartungs- und Reparaturarbeiten durchgeführt werden. Darüber hinaus lässt sich die Summenleistung beider Sender zum Messen auf die Kunstantenne schalten.

Zur Umschaltung werden fernsteuerbare 2-Wege Motorschalter eingesetzt. Im Notbetrieb können die Motorschalter auch manuell bedient oder durch Bügelstecker ersetzt werden. In allen Fällen stehen Interlock-Kontakte zur Verfügung. SPINNER liefert Parallelschalteinrichtungen für FM, VHF und UHF in verschiedenen Leistungsklassen für analoge und digitale Übertragung.

Parallel switching units are used to double the output power by combining two transmitters operating on the same frequency and with a phase difference of 90 degrees. Usually the failure of one transmitter causes the output power to drop down to 25 % of the original output because half of the power from the working transmitter flows into the balancing load of the 3 dB coupler.

The SPINNER parallel switching unit can route transmitter 1 or transmitter 2 directly to the antenna and transmitter 2 or transmitter 1 to the dummy load within seconds.
Thus 50 % of the original output power is available again and the disconnected transmitter is free for repair or maintenance work. Furthermore, the combined output of both transmitters can be routed to the dummy load for measurements.

Switching is done by remotely controlled 2-way motor switches. In emergencies the motor switches can be operated manually or be replaced by U-links. In all cases interlock contacts are available.
SPINNER delivers parallel switching units for FM, VHF and UHF in various power ratings for analogue and digital transmission.



Schaltmöglichkeiten

Standard-Betrieb:
- Sender S1 und S2 auf Antenne
- Messanschluss auf Kunstantenne

Not-Betrieb:
- Sender auf Antenne
- defekter Sender auf Kunstantenne zum Messen bzw. zur Reparatur

Sender Messen:
- Sender S1 und S2 auf Kunstantenne
- Messanschluss auf Antenne

Switching Possibilities

Standard operation:
- transmitters TX1 and TX2 to antenna
- measuring port to dummy load

Emergency operation:
- working transmitter to antenna
- defect transmitter to dummy load for measurement or repair

Measurement purposes:
- transmitters TX1 and TX2 to dummy load
- measuring port to antenna

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7 KW PARALLELSCHALTEINRICHTUNGEN
7 KW PARALLEL SWITCHING UNITS

- Schaltung mit Bügelstecker oder Motorschalter (s. Optionen)
- Motorschalter mit Steuerspannung 8-31VDC oder 230VAC verfügbar
- Brückenwiderstand integriert
- Interlock-Kontakte und Signalkontakte
- Messstellen

- operation with U-links or motorized switches (see options)
- motorized switches with control voltage 8-31VDC or 230 VAC are available
- integrated balancing load
- interlock contacts and position signal contacts supplied
- measurement port

Bestellnummer Part number	**BN 53 65 80 A0300**	**BN 53 65 81 A0300**
Frequenzbereich Frequency range	470 - 860 MHz	
Effektive Leistung Average power	2 x ≤ 2 kW	2 x ≤ 3.5 kW
Leistung Brückenwiderstand Power balancing load	1 kW	2 kW
Durchgangsdämpfung Insertion loss	≤ 0.1 dB	
VSWR	≤ 1.08	
Umschaltgröße Switching port size	1 5/8" USL-D	
Anschluss Eingang Input connectors	1 5/8" EIA	
Anschluss Ausgang Output connectors	1 5/8" EIA	
Aufsteckschalter Plug in switch	BN 55 30 64	
Messrichtkoppler Directional coupler	Ausgang Brückenwiderstand und Kunstantenne output at balancing load and dummy load	
Anzahl der Interlock-Kontakte Number of interlocks-contacts	4	
Rating of the interlock contacts max. Spannung max. Voltage max. Strom max. Current	≤ 60.0 V DC ≤ 42.4 V AC_{pk} ≤ 0.75 A	
Phasendifferenz zwischen TX1 / TX2 Phase difference between TX1 / TX2	- 90° / 0°	
Bügelstecker mit gleicher elektrischer Länge wie Aufsteckschalter U-link with identical electrical length as plug-in switch	BN 55 30 33	
Abmessungen (L x B x H) mm Dimensions (L x W x D) mm	1980 x 575 x 900	
Gewicht Weight	145 kg	170 kg
Umweltbedingungen Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	
Options based on the selected application		
Motor Aufsteckschalter Motor switch	BN 55 30 65 / BN 64 00 82 / BN 64 00 81	
Bügelstecker, Standard U-link standard	BN 55 30 31	
Dummy Load	BN 53 42 65	BN 54 64 50
Messübergänge Measurement adaptors	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors	

Typical design
with plug in switches

17,5 KW PARALLELSCHALTEINRICHTUNGEN
17.5 KW PARALLEL SWITCHING UNITS

- Schaltung mit Bügelstecker oder Motorschalter (s. Optionen)
- Motorschalter mit Steuerspannung 8-31VDC oder 230VAC verfügbar
- Brückenwiderstand integriert
- Interlock-Kontakte und Signalkontakte
- Messstellen

- operation with U-links or motorized switches (see options)
- motorized switches with control voltage 8-31VDC or 230 VAC are available
- integrated balancing load
- interlock contacts and position signal contacts supplied
- measurement port

Bestellnummer Part number	**BN 53 65 82 A0300**	**BN 53 65 83 A0300**	**BN 53 65 84 A0300**
Frequenzbereich Frequency range	470 - 860 MHz		
Effektive Leistung Average power	2 x ≤ 4 kW	2 x ≤ 5 kW	2 x ≤ 8.75 kW *)
Leistung Brückenwiderstand Power balancing load	2 kW	2.5 kW	5 kW
Durchgangsdämpfung Insertion loss	≤ 0.1 dB		
VSWR	≤ 1.08		
Umschaltgröße Switching port size	29.5-68 USL-D		
Anschluss Eingang Input connectors	1 5/8" EIA		3 1/8" EIA
Anschluss Ausgang Output connectors	3 1/8" EIA		3 1/8" EIA
Aufsteckschalter Plug in switch	BN 55 33 64		
Messrichtkoppler Directional coupler	Ausgang Brückenwiderstand und Kunstantenne output at balancing load and dummy load		
Anzahl der Interlock-Kontakte Number of interlocks-contacts	4		
Rating of the interlock contacts max. Spannung max. Voltage max. Strom max. Current	≤ 60.0 V DC ≤ 42.4 V AC_{pk} ≤ 0.75 A		
Phasendifferenz zwischen TX1 / TX2 Phase difference between TX1 / TX2	- 90° / 0°		
Bügelstecker mit gleicher elektrischer Länge wie Aufsteckschalter U-link with identical electrical length as plug-in switch	BN 55 33 34		
Abmessungen (L x B x H) mm Dimensions (L x W x D) mm	1980 x 800 x 900		
Gewicht Weight	260 kg	260 kg	270 kg
Umweltbedingungen Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“		
Options based on the selected application			
Motor Aufsteckschalter Motor switch	BN 55 33 65 / BN 94 19 18 / BN 94 19 17		
Bügelstecker, Standard U-link standard	BN 55 33 31		
Dummy Load	BN 54 64 50		BN 54 64 60
Messübergänge Measurement adaptors	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors		

Typical design
with plug in switches

*) Attention: The max power needs to be adjusted, if operated with motorized switch.

Data subject to change without notice – Edition E

30 KW PARALLELSCHALTEINRICHTUNGEN
30 KW PARALLEL SWITCHING UNITS

- Schaltung mit Bügelstecker oder Motorschalter (s. Optionen)
- Motorschalter mit Steuerspannung 8-31VDC oder 230VAC verfügbar
- Brückenwiderstand integriert
- Interlock-Kontakte und Signalkontakte
- Messstellen

- operation with U-links or motorized switches (see options)
- motorized switches with control voltage 8-31VDC or 230 VAC are available
- integrated balancing load
- interlock contacts and position signal contacts supplied
- measurement port

Bestellnummer Part number	**BN 53 65 85 A0300**	**BN 53 65 86 A0300**
Frequenzbereich Frequency range	470 - 860 MHz	
Effektive Leistung Average power	2 x ≤ 10 kW	2 x ≤ 15 kW *)
Leistung Brückenwiderstand Power balancing load	5 kW	10 kW
Durchgangsdämpfung Insertion loss	≤ 0.1 dB	
VSWR	≤ 1.08	
Umschaltgröße Switching port size	43-98 USL-D	
Anschluss Eingang Input connectors	3 1/8" EIA	
Anschluss Ausgang Output connectors	4 1/2" EIA 339 IEC 50-105	
Aufsteckschalter Plug in switch	BN 55 36 64	
Messrichtkoppler Directional coupler	Ausgang Brückenwiderstand und Kunstantenne output at balancing load and dummy load	
Anzahl der Interlock-Kontakte Number of interlocks-contacts	4	
Rating of the interlock contacts max. Spannung max. Voltage max. Strom max. Current	 ≤ 60.0 V DC ≤ 42.4 V AC_{pk} ≤ 0.75 A	
Phasendifferenz zwischen TX1 / TX2 Phase difference between TX1 / TX2	- 90° / 0°	
Bügelstecker für Aufsteckschalter Spare U-link for plug-in switch	BN 55 36 11	
Abmessungen (L x B x H) mm Dimensions (L x W x D) mm	1980 x 800 x 900	
Gewicht Weight	340 kg	350 kg
Umweltbedingungen Environmental conditions	for limitations see „Environmental Conditions for Broadcast Products“	
Options based on the selected application		
Motor Aufsteckschalter Motor switch	BN 55 36 65 / BN 94 19 44	
Bügelstecker, Standard U-link standard	BN 55 36 11	
Dummy Load	BN 54 64 60	BN 54 64 70
Messübergänge Measurement adaptors	Siehe Bügelstecker und Messübergänge See U-links and measurement adaptors	

*) Attention: The max power needs to be adjusted, if operated with motorized switch.

Typical design
with plug in switches

UHF 30 KW SWITCHLESS COMBINER

Aktive Reserve ohne Sendeunterbrechung mit Switchless Combiner

Es ist gängige Praxis zwei Sender gleicher Frequenz und Leistung mit einem 3 dB Koppler zusammenzuschalten. Am Ausgang des Kopplers erhält man im Normalbetrieb die Summenleistung der beiden Sender. Sobald ein Sender ausfällt, steht am Kopplerausgang nicht die halbe Leistung (entsprechend einem arbeitendem Sender) sondern nur noch ein Viertel der Summenleistung an.
Deshalb wird der funktionierende Sender auf die Antenne geschaltet und der ausgefallene auf eine Kunstantenne.
Isoliert vom Sendebetrieb kann er repariert und getestet werden. Erfolgt die Umschaltung manuell mit Bügelsteckern muss der Sendebetrieb für wenige Minuten unterbrochen werden. Auch wenn die Umschaltung automatisiert mit Transferschaltern realisiert ist, muss der Sendebetrieb unterbrochen werden, da die Transferschalter nicht unter Last geschaltet werden können. Der Switchless Combiner ermöglicht ein unterbrechungsfreies „Umschalten“ der HF-Pfade während des Sendebetriebes.

SPINNER hat viele Parallelschalteinrichtungen mit Bügelsteckern oder Transferschaltern mit Motorantrieb angefertigt. Als Alternative dazu ist nun ein Switchless Combiner in SPINNER-Qualität verfügbar. Als Entscheidungshilfe für unsere Kunden werden die beiden konkurrierenden Systeme nachfolgend miteinander verglichen.

Wesentliche Eigenschaften von Parallelschalteinheiten mit Bügelsteckern oder automatisierten Transferschaltern:

- kein Schalten unter Last möglich
- hohe Isolation der Sender durch galvanische Trennung der HF-Pfade mittels Schalter oder Bügelstecker
- Umschaltung der HF-Pfade ergibt sich aus der Schalterstellung und ist unabhängig von der Betriebsfrequenz

Wesentliche Eigenschaften eines Switchless Combiners:

- Schalten unter Last problemlos möglich
- Sender werden nicht galvanisch abgetrennt; Isolation der Sender etwa 35 dB, realisiert durch 3 dB Koppler
- das Funktionsprinzip beruht auf einer mittels Phasenverschiebung veränderbaren Interferenz; der Switchless Combiner muss auf den Betriebskanal abgestimmt werden

Der Switchless Combiner von SPINNER besteht aus zwei 3 dB Kopplern, deren Ports je mit einer festen Leitungslänge und mit einem Phasenschieber verbunden sind. Der Phasenschieber ist als motorisch betätigte koaxiale Auszugleitung realisiert. Eine intelligente Steuerung überwacht alle Betriebszustände und macht die Ansteuerung so einfach wie bei einer Paralleschalteinrichtung.
Selbstverständlich kann der Switchless Combiner nicht nur ferngesteuert werden, sondern ebenso vom Frontpanel vor Ort bedient werden.

Switchless Combiner for Active-Reserve Transmitters

It is common practice to combine the power of two transmitters via 3 dB couplers to get double output power for normal operation. To avoid the possibility that power supplied to the antenna drops to one quarter if one transmitter fails, the good transmitter is switched directly to the antenna and the faulty one is isolated for repair. If this switching is performed by manual U-links the transmission must be interrupted for a few minutes.
Even if switching is done via motor-driven switches, transmission must be interrupted because the switches do not allow hot switching. The switchless combiner performs the switching by means of phase shifting and therefore it allows rerouting of the signals without interruption of transmission.

SPINNER has supplied many traditional parallel switching units with U-links or motor-driven switches and is now also offering switchless combiners in “SPINNER Quality” as an alternative.

Before the details of the switchless combiner are explained, we will compare the two principles to assist customers and explain why SPINNER is offering these competing designs in parallel.

Parallel switching units with U-links or motor-driven switches:

- no hot switching
- high isolation of transmitters by galvanic separation of RF paths by means of switches or U-link
- function is defined by switch positions and is independent of operating frequency

Switchless combiner with trombone as phase shifter:

- hot switching
- transmitters are not galvanic separated; isolation of 35 dB provided by 3 dB couplers
- function is defined by the position of the trombone and needs readjustment in case of frequency change

The SPINNER switchless combiner consists of two hybrid couplers which are connected by one fixed transmission line and a motor-driven trombone acting as a mechanical phase shifter. A sophisticated control unit makes the switchless combiner as easy to handle as a parallel switching unit, allowing local and remote control.

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UHF 30 KW SWITCHLESS COMBINER

Der Switchless Combiner wird ab Werk auf den gewünschten Kanal im UHF Band abgestimmt. Zur Inbetriebnahme ist der Switchless Combiner nur mit dem Stromnetz und den beiden Sendern zu verbinden. Die Wahl der Betriebsart erfolgt über eine Steuerspannung am jeweiligen Eingang oder über einen Tastendruck am Bedienpanel.

Die Steuereinheit verfährt dann den motorisierten Phasenschieber, bis die gewünschte Betriebsart eingestellt ist. Währenddessen kann unterbrechungsfrei weitergesendet werden. Beide Eingänge sind immer angepasst.

Bei der Entwicklung wurde großer Wert auf Funktions- und Ausfallsicherheit sowie der Möglichkeit eines Notbetriebes von Hand gelegt:

- Der Switchless Combiner behält den Betriebszustand bei, auch wenn die Steuersignale oder die Stromversorgung unterbrochen werden. Kehren sie wieder zurück, nimmt die Steuerung des Switchless Combiners den Betrieb wieder auf.
- Der Switchless Combiner kann ohne Stromversorgung auch von Hand betätigt werden.
- Unabhängig von der Funktion der Steuerung oder einer Netzversorgung kann der Betriebszustand des Switchless Combiners jederzeit über potentialfrei ausgeführte Schaltkontakte abgefragt werden.
- Die Steuerung gibt sowohl vor Ort als auch fernbedient Warnungen und kritische Fehlerzustände aus.

Der Switchles Combiner kann vor Ort auf jeden UHF-Kanal umgestimmt werden, dazu müssen mit einem Netzwerkanalysator die neuen Positionen des Phasenschiebers eingestellt und die 3dB-Koppler optimiert werden.

SPINNER bietet all das Zubehör an, welches bei Installation, Umstimmung und Betrieb notwendig oder nützlich ist:

- Abschlusswiderstände
- Messrichtkoppler
- Messübergänge und Kalibrier Kits

Der Switchless Combiner ist eine Alternative von SPINNER für all die Netzwerkbetreiber, deren Priorität auf völlig unterbrechungsfreien Sendebetrieb liegt.

Anmerkung:
Die HF-Signale der Sender müssen phasengleich an den Eingängen des Switchless Combiners anliegen.

The switchless combiner can be factory tuned to any channel in the UHF band. To start operation the switchless combiner only needs to be connected to the mains supply. Selecting the operating mode is easy: In the remote mode apply a signal to the appropriate input pin in the local mode press the button on the control panel.

Then the control unit will start the motor to move the phase shifter into the predefined position and the RF signal will be rerouted. While the phase shifter is moving, the transmitters can continue without power interruption, the input ports are always matched and the routing of the power is fine.

The SPINNER switchless combiner also features safety and emergency functions:

- retains position, even if control signals or mains supply are interrupted and continues operation if the signals are reinstated
- can be operated manually
- a set of potential-free signalization switches is available independent of the control unit and mains supply, to provide feedback that the switchless combiner has reached the desired operating mode
- the control unit provides warning and error signalisation

The switchless combiner can be readjusted on site to any channel within the UHF band (by finding the new positions of the phase shifter and optimizing the 3 dB couplers) with the help of a network analyzer.

SPINNER offers all accessories which are necessary or useful for installation, retuning and operation the switchless combiner:

- loads
- monitoring couplers
- measurement adaptors and calibration kits

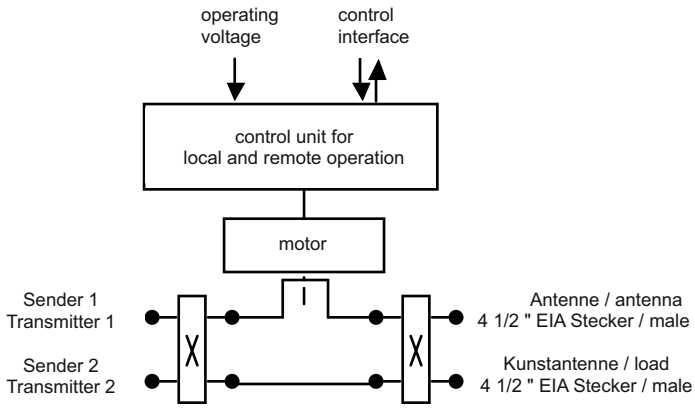
The switchless combiner is an alternative offer from SPINNER for network operators whose priority is to avoid any interruption of transmission.

Remark:
The RF signals from the transmitters must be adjusted to be in phase at the inputs.

UHF 30 KW SWITCHLESS COMBINER

- Schalten unter Last problemlos möglich
- einfache Fernüberwachung aller Funktionen
- Rückmeldung der Betriebsart und Interlock Signale
- geeignet für ATV und DTV
- für 6, 7 und 8 MHz Kanalbandbreite
- durchstimmbar im gesamten UHF Bereich
- CCS Kompaktweiche

- hot switching
- simple remote control of all functions
- feedback of operation mode and interlock signals
- suitable for analogue and digital TV
- for 6, 7 and 8 MHz channel bandwidth
- tuneable within the whole UHF range
- CCS compact design



Bestellnummer Part number	**BN 53 65 74**	
Frequenzbereich Frequency range	470 - 860 MHz	
Eingangsleistung Input power	≤ 15 kW per input	
Prüfspannung Proof voltage	16 kV	
Durchgangsdämpfung Insertion loss	≤ 0.15 dB	
Senderentkopplung Isolation between inputs	≥ 35 dB	
VSWR	≤ 1.1	
Betriebsarten Operation modes	S1+S2 auf Antenne S1 auf Antenne und S2 auf Kunstantenne S2 auf Antenne und S1 auf Kunstantenne S1+S2 auf Kunstantenne	TX1+TX2 to antenna TX1 to antenna and TX2 to load TX2 to antenna and TX1 to load TX1+TX2 to load
Umschaltzeit Switching time	10 - 20 s	
Steuerung Operation control	am Bedienpanel oder per Fernsteuerung local via front panel or remote by control signals	
HF eingang RF input	3 1/8" EIA Stecker/male	
HF Ausgang RF output	4 1/2" EIA Stecker/male 339 IEC 50-105	
Fernsteuerschnittstelle Remote control interface	DC-37-D-sub oder Klemmleiste / or terminal block	
Betriebsspannung Anschluss Operating voltage interface	IEC 60320 C14 Kaltgerätestecker/male	
Betriebsspannung Operating voltage	85 - 250 VAC; 47 - 63 Hz	
Stromaufnahme Operating current	≤ 3 A	
Fernsteuerung Eingang Control signal inputs	8 - 24 VDC	
Fernsteuerung Ausgang Control signal outputs	potentialfreie Kontakte oder Schalter potention-free relay contact or switches; V ≤ 60 VDC; I ≤ 30 A	
Abmessungen (L x B x H) mm Dimensions (L x W x D) mm	900 x 390 x 1420	
Gewicht Weight	ca. 97 kg	
Umweltbedingungen *) Environmental conditions	Max. Höhe über N.N 5000 m (begrenzt durch Netzteil) Max. altitude AMSL 1.600 ft (limited by power supply)	

*) for limitations see „Environmental Conditions for Broadcast Products“

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UHF 30 KW SWITCHLESS COMBINER

Zubehör, optional
Recommended Accessories for Operation

Bauteil **Device**		**Bestellnummer** **Part number**
Doppel-Messrichtkoppler Directional coupler with two probes	4 1/2" EIA N Kuppler/female 339 IEC 50-105	**BN 80 03 64**
Abschlusswiderstand flüssigkeitsgekühlt Load liquid cooled	10 kW 20 kW 30 kW	**BN 54 64 50** **BN 54 64 60** **BN 54 64 70**
Abschlusswiderstand luftgekühlt mit Gebläse, temperaturgesteuert Load with forced air cooling, temperature-controlled	10 kW	**BN 53 42 92**

KOAXIALE 2-WEGE SCHALTER
COAXIAL 2-WAY SWITCHES

Seit mehr als 65 Jahren entwickelt und produziert SPINNER, als innovatives Unternehmen in der Hochfrequenztechnik, optimale Lösungen und Systeme. SPINNER HF-Schalter haben sich von Beginn an als äußerst zuverlässige und robuste Produkte bei bester Performance bewährt.

Das SPINNER Schalter Portfolio umfasst eine große Auswahl an unterschiedlichen Schaltertypen für den Einsatz in der Hochfrequenztechnik. Als herausragende Eckpunkte zählen HF-Leistungen von wenigen Watt bis zu mehreren hundert Kilowatt sowie koaxiale Größen von N bis 6 1/8" für Frequenzen bis zu einigen GHz.

Je nach Antriebskonzept erzielen SPINNER Schalter (Hubmagnet, Impulsdrehmagnet oder Motor) Umschaltzeiten von 25 ms bis zu ca. einer Sekunde. SPINNER Schalter sind bekannt als die kompaktesten und schnellsten HF-Schalter auf dem Markt.

Auf Grund der hohen Betriebssicherheit werden SPINNER Schalter bevorzugt in Anlagen eingesetzt, welche eine hohe Ausfallsicherheit aufweisen müssen. Die 2+1- und 4+1-Schaltsysteme sind eine hervorragende Lösung für Redundanzsysteme in einem kompakten 19" Format mit nur einer Höheneinheit.

As a globally established innovative company, SPINNER has been developing and producing highly sophisticated RF solutions and systems that for more than 65 years. From the very beginning, SPINNER RF switches have proven to be extremely reliable and robust with excellent performance.

The SPINNER portfolio of switches comprises a great variety of different types, for frequencies up to several GHz and sizes ranging from N to 6 1/8" with RF powers from a few watts to several hundreds of kilowatts.

With different drive concepts (lifting magnet, impulse solenoid, motor drive) and precision engineering, SPINNER RF switches achieve very quick switching times from 25 ms to approximately one second, making them known as the fastest and most compact available RF switches on the market.

Due to their high and dependable performance, SPINNER switches are preferably used in systems that require a high level of reliability. The 2+1- and 4+1-switching units developed by SPINNER provide an excellent solution for redundancy systems in an extremely compact 19" one RU format.

KOAXIALE 2-WEGE SCHALTER – TECHNISCHER ANHANG
COAXIAL 2-WAY SWITCHES – TECHNICAL ANNEX

Handbetätigung

Bei Schaltern mit Handbetätigung wird die jeweilige Schaltstellung mit einem Drehknopf am Schalter vom Anwender manuell gewählt. Der Schalter ist in den Endstellungen so verriegelt, dass auch bei Vibrations- und Rotationsbelastungen um die Rotorachse der jeweilige Schaltzustand erhalten bleibt.

Manual Operation

For manually operated switches the user selects the desired switch position by means of a knob on the switch. The switch is locked in its end positions so that the selected switch position is kept, even during vibration or rotation around the rotor axis.

Impulsdrehmagnetantrieb

Bei Schaltern mit Impulsdrehmagnetantrieb erzeugt ein drehbar gelagerter Dauermagnet, der von einer stationären Spule umschlossen ist, das Drehmoment für den Rotor. Der Antrieb hat zwei stabile Schaltstellungen und ist in den Endstellungen verriegelt (bistabil). Deshalb genügt ein Steuersignal in Impulsform zum Betätigen des Schalters, d.h. nach erfolgtem Umschalten muss keine Spannung mehr anliegen. Bei Ausfall und Rückkehr der Betriebsspannung bleibt die jeweilige Schaltstellung erhalten.

Impulse Solenoid Drive

Switches with impulse solenoid drive generate the torque for the rotor with a rotating permanent magnet located in a stationary coil. The drive system has two stable switching positions and is locked in both end positions (latching). Therefore a pulse is sufficient as a control signal (e.g. after switching no voltage is required). In the event of power failure, or after restarting the system, the last switch position is retained.

Hubmagnetantrieb

Ein Magnetanker wird durch elektromagnetische Krafteinwirkung von seiner Hubanfangslage in die Hubendlage bewegt. In der Endlage wird der Anker über einen Hilfsmagneten gehalten (bistabil). Nach erneuter Stromzufuhr erfolgt die Rückstellung des Magnetankers in seine Hubanfangslage mit Hilfe einer Feder.

Lifting Magnet Drive

By application of electromagnetic force a lever is lifted from its resting position to its final position at the end of the stroke. In its end position the lever will be kept by an auxiliary magnet (latching). After an electrical reset the lever will be pushed back and hold by a spring.

Motorantrieb

Ein Kondensatormotor (230V/50-60Hz) erzeugt über ein von SPINNER entwickeltes Spezialgetriebe (siehe Hypozykloidengetriebe) das notwendige Drehmoment, um den Schalter zu betätigen. Dieses Antriebssystem besitzt einen Drehwinkel von 90° und ist in den Endstellungen verriegelt.

Motor Drive

Motor driven switches use a capacitor motor (230V/50-60Hz) with a special gear (see hypocycloidic gear), developed by SPINNER, which generates the torque required to turn the switch. This drive system has a 90° rotation angle and is locked in both end positions.

Hypozykloidengetriebe

Der Antrieb und das Schaltergrundteil sind über ein von SPINNER entwickeltes Spezialgetriebe gekuppelt. Dieses Hypozykloidengetriebe bewirkt, dass sich Drehmoment und Winkelgeschwindigkeit über den Drehbereich des Schalters verändern.
Am Beginn des Umschaltvorgangs steht ein sehr hohes Drehmoment zur Verfügung, während die Winkelgeschwindigkeit des Schalter-Rotors sehr gering ist. Mit zunehmendem Drehwinkel steigt nun die Winkelgeschwindigkeit kontinuierlich an, während das Drehmoment abnimmt. Nach Durchfahren der Mittelstellung des Rotors kehrt sich dieses Verhalten um und die Winkelgeschwindigkeit nimmt ab, während das nutzbare Drehmoment zunimmt.
Der Antrieb ist in den Endstellungen mechanisch verriegelt.

Hypocycloidic Gear

The drive and the basic switch element (rotor) are connected by a special gear which has been developed by SPINNER. With the hypocycloidic gear it is achieved that the torsional moment and angular velocity changes within the range of rotation.
In the beginning of the changeover procedure there is a high torsional moment whereas the angular velocity of the rotating breaker is very low. With an increasing angle of revolution the angular velocity will increase as well while the torsional moment will decrease. On the mid-position of the rotating breaker this behavior will reverse and the angular velocity is decreasing while the torsional moment increases.
The drive system is mechanically locked in both end positions.

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KOAXIALE 2-WEGE SCHALTER – TECHNISCHER ANHANG
COAXIAL 2-WAY SWITCHES – TECHNICAL ANNEX

Signal- und Trägersicherheitskontakte

Die Signalkontakte sind potentialfrei als Umschalter ausgeführt und zeigen die jeweilige Endstellung des Schalters an. Die Trägersicherheitskontakte sind mit den HF-Kontakten mechanisch gekoppelt. Bei Auslösen des Schaltvorgangs schalten die Trägersicherheitskontakte vor der Trennung und nach dem Einrasten der HF-Kontakte in der neuen Position.
Beide Kontakte können bis zur maximalen Belastung von 42,4 VACpk / 60 VDC / 0,5 A bzw. 50 VDC, 0,1 A bei den BN 512663 und BN 512665 verwendet werden.

Signalling and Interlock Contacts

The signal contacts are designed as potential-free SPDT contacts and indicate the actual switch position.
The interlock contacts are coupled with the RF contacts allowing the shutdown of RF power before and during switching. While switching the interlock contacts open before the separation of the RF contacts and closes after the RF contacts are in the new position.
The maximum switching load of these contacts is 42.4 VACpk / 60 VDC / 0.5 A DC or 50 VDC, 0.1 A for the BN 512663 and 512665.

Schutzart

Alle Schalter sind gemäß IP40 (EN60529) nur für Innenraummontage geeignet. Schalter für Außenmontage sind auf Anfrage verfügbar.

Degree of Protection

According to IP40 (EN60529) the switches are only suitable for indoor installation. Switches for outdoor installation are available on request.

Leistungsangaben

Alle Leistungsangaben gelten bei Raumtemperatur (ca. 25 °C), Normaldruck (ca. 1000 hPa), einer relativen Luftfeuchtigkeit von ca. 50 % und HF-Anpassung. Die spezifizierte Leistung (Dauerbelastbarkeit) gilt für die höchste angegebene Frequenz und kann über beide Schalterwege gleichzeitig übertragen werden. Für den Betrieb mit Impulsleistung bitten wir um Anfrage mit detaillierten Pulsdaten.

Power Ratings

All power ratings refer to room temperature (approx. 25 °C), normal air pressure (approx. 1000hPa), a relative humidity of approx. 50 % and in RF-matched condition. Specified power ratings are valid for the highest given frequency and can be transmitted through both switch paths simultaneously. For operation with pulsed power please send an enquiry with the detailed data of the pulse.

Abmessungen

Alle Abmessungen sind in mm angegeben.

Dimensions

All dimensions are given in mm.

Anmerkung:

Bei Betrieb mit digitalen Signalen (z.B. DAB, DVB-T, ATSC, ISDB-T,…) wird die effektive übertragbare Leistung durch die Prüfspannung unter der Einbeziehung des Crestfactors begrenzt. Bei Mehrsenderbetrieb ist sowohl bei analogen wie auch bei digitalen Signalen die Summe der Einzelspannungen zu berücksichtigen.

Note:

The maximum average power transmittable of digital signals (e.g. DAB, DVB-T, ATSC, ISDB-T,…) is rated by the RF proof voltage under inclusion of the Crestfactor. For multi transmitter operation with analogue or digital signals the sum of the voltages must be considered.

KOAXIALE 2-WEGE SCHALTER
COAXIAL 2-WAY SWITCHES

2-WEGE SCHALTER (DPDT)
2-WAY SWITCHES (DPDT)

Bestell-Nr. Part number	Anschlüsse Connectors	Effektive Eingangsleistung Average input power			Antriebsart Type of drive
		100 MHz	230 MHz	860 MHz	
BN 75 40 67	N Kuppler N female	≤ 0.75 kW	≤ 0.75 kW	≤ 0.75 kW	Impulsdrehmagnet Impulse solenoid
BN 75 40 30 **BN 75 40 98** **BN 75 40 66**	N Kuppler N female	≤ 0.79 kW	≤ 0.79 kW	≤ 0.79 kW	Impulsdrehmagnet Impulse solenoid
BN 51 26 90	7-16 Kuppler 7-16 female	≤ 5.0 kW	≤ 3.5 kW	≤ 2.0 kW	Impulsdrehmagnet Impulse solenoid
BN 51 26 97 **BN 51 26 98**	7/8" EIA	≤ 8.0 kW	≤ 5.0 kW	≤ 2.5 kW	Motor
BN 64 00 81 **BN 64 00 82**	1 5/8" EIA	≤ 20.0 kW	≤ 13.5 kW	≤ 7.0 kW	Motor
BN 94 19 17 **BN 94 19 18**	3 1/8" EIA	≤ 73.0 kW	≤ 48.0 kW	≤ 25.0 kW	Motor
BN 94 19 44	4 1/2" EIA	≤ 100.0 kW	≤ 70.0 kW	≤ 38.0 kW	Motor
BN 94 19 89	6 1/8" EIA	≤ 170.0 kW	≤ 110.0 kW	≤ 60.0 kW *)	Motor

*) @ 800 MHz

2-WEGE AUFSTECKSCHALTER FÜR FRONTPLATTENMONTAGE (DPDT)
2-WAY PLUG-IN SWITCHES FOR FRONT PANEL INSTALLATION (DPDT)

Best.-Nr. Part number	Anschlüsse Connectors	Effektive Eingangsleistung Average input power			Antriebsart Type of drive
		100 MHz	230 MHz	860 MHz	
BN 55 30 64 **BN 55 30 65**	1 5/8" USL-D	≤ 20.0 kW	≤ 13.5 kW	≤ 7.0 kW	Motor
BN 55 33 64 **BN 55 33 65**	29 - 68 USL-D	≤ 41.0 kW	≤ 21.0 kW	≤ 14.0 kW	Motor
BN 55 36 64 **BN 55 36 65**	43 - 98 USL-D	≤ 82.0 kW	≤ 42.0 kW	≤ 28.0 kW	Motor

N+1 SCHALTSYSTEME
N+1 SWITCHING UNITS

Best.-Nr. Part number	Anschlüsse Connectors	Effektive Eingangsleistung Average input power			Antriebsart Type of drive
		100 MHz	230 MHz	860 MHz	
BN 51 26 63 **BN 51 26 65**	N Kuppler N female	≤ 280 W	≤ 200 W	≤ 130 W	Hubmagnet Lifting magnet

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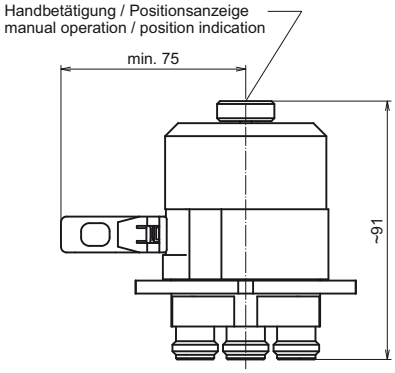
2-WEGE SCHALTER MIT N ANSCHLÜSSEN, BISTABIL
2-WAY SWITCHES WITH N CONNECTORS, LATCHING

- Impulsdrehmagnetantrieb
- optische Positionsanzeige
- Handbetätigung
- Endlagen-Signalkontakte

- impulse solenoid drive
- optical position indicator
- manual operation
- end position signal contacts

Bestellnummer Part number		**BN 75 40 67**
Anschlüsse Connectors		N Kuppler N female
Frequenzbereich Frequency range		0 - 2 GHz
Prüfspannung [1] Proof voltage [1]		≤ 2.3 kV
Effektive Leistung [1] Average power [1]	0 - 1 GHz 1 - 2 GHz	≤ 0.75 kW ≤ 0.50 kW
VSWR	0 - 1 GHz 1 - 2 GHz	≤ 1.04 ≤ 1.15
Übersprechdämpfung Isolation	0 - 1 GHz 1 - 2 GHz	≥ 80 dB ≥ 75 dB
Durchgangsdämpfung Insertion loss	0 - 1 GHz 1 - 2 GHz	≤ 0.05 dB
Betriebsspannung Operating voltage		24 V DC ± 10 %
Steuerspannung Control voltage		24 V DC ± 10 %
Stromaufnahme Operating current		≤ 0.8 A
Umschaltzeit [1] Switching time [1]		≤ 80 ms
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 250.000
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C
Gewicht Weight		0.45 kg

[1] Siehe Anmerkungen auf Seite 143
See notes on page 143



2-WEGE SCHALTER MIT N ANSCHLÜSSEN, BISTABIL

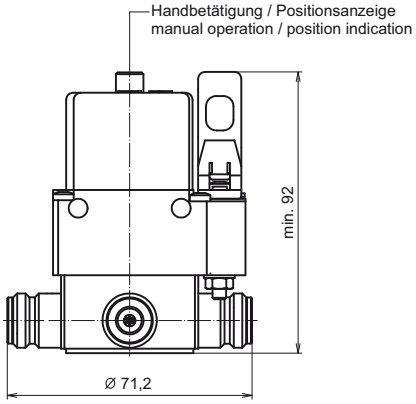
2-WAY SWITCHES WITH N CONNECTORS, LATCHING

- Impulsdrehmagnetantrieb
- optische Positionsanzeige
- Handbetätigung
- Endlagen-Signalkontakte

- impulse solenoid drive
- optical position indicator
- manual operation
- end position signal contacts

Bestellnummer **Part number**		**BN 75 40 98**	**BN 75 40 30** **BN 75 40 66** [2]
Anschlüsse Connectors		N Kuppler N female	
Frequenzbereich Frequency range		0 - 5 GHz	
Prüfspannung [1] Proof voltage [1]		≤ 3.0 kV	
Effektive Leistung [1] Average power [1]	0 - 1 GHz 1 - 2 GHz 2 - 3 GHz 3 - 5 GHz	≤ 0.79 kW ≤ 0.56 kW ≤ 0.45 kW ≤ 0.35 kW	
VSWR	0 - 1 GHz 1 - 3 GHz 3 - 5 GHz	≤ 1.03 ≤ 1.13 ≤ 1.22	
Übersprechdämpfung Isolation	0 - 1 GHz 1 - 3 GHz 3 - 5 GHz	≥ 75 dB ≥ 60 dB ≥ 50 dB	
Durchgangsdämpfung Insertion loss	0 - 2 GHz 3 - 5 GHz	≤ 0.04 dB ≤ 0.06 dB	
Betriebsspannung Operating voltage		12 VDC ± 5 %	25.0 VDC ± 10 % 24.0 VDC ± 10 % [2]
Steuerspannung Control voltage		12 VDC ± 5 %	25.0 VDC ± 10 % 24.0 VDC ± 10 % [2]
Stromaufnahme Operating current		≤ 0.9 A	≤ 0.6 A ≤ 1.1 A [2]
Umschaltzeit [1] Switching time [1]		≤ 40 ms / ≤ 100 ms [2]	
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 250.000	
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C	
Gewicht Weight		0.6 kg / 0.8 kg [2]	

[1] Siehe Anmerkungen auf Seite 143
See notes on page 143
[2] mit Interlockkontakten
with Interlock contacts



Data subject to change without notice – Edition E

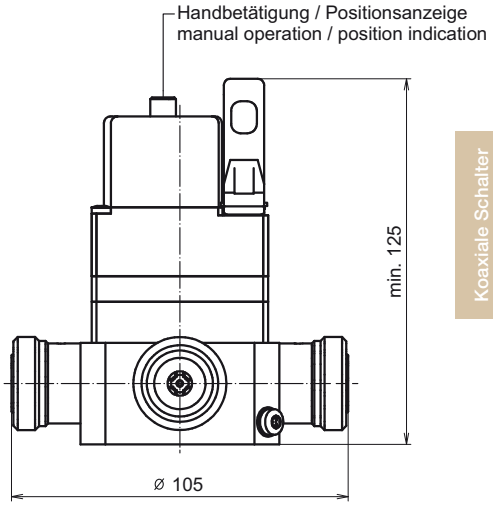
2-WEGE SCHALTER MIT 7-16 ANSCHLÜSSEN, BISTABIL
2-WAY SWITCHES WITH 7-16 CONNECTORS, LATCHING

- Impulsdrehmagnetantrieb
- optische Positionsanzeige
- Handbetätigung
- voreilende Interlock-Kontakte
- Endlagen-Signalkontakte

- impulse solenoid drive
- optical position indicator
- manual operation
- advanced interlock contacts
- end position signal contacts

Bestellnummer Part number		**BN 51 26 90**
Anschlüsse Connectors		7-16 Kuppler 7-16 female
Frequenzbereich Frequency range		0 - 5 GHz
Prüfspannung [1] Proof voltage [1]		≤ 4.0 kV
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 860 MHz	≤ 5.0 kW ≤ 3.5 kW ≤ 2.0 kW
VSWR	100 MHz 230 MHz 860 MHz	≤ 1.02 ≤ 1.02 ≤ 1.04
Übersprechdämpfung Isolation	100 MHz 230 MHz 860 MHz	≥ 80 dB
Durchgangsdämpfung Insertion loss		≤ 0.05 dB
Betriebsspannung Operating voltage		24 VDC ± 10 %
Steuerspannung Control voltage		24 VDC ± 10 %
Stromaufnahme Operating current		≤ 1.1 A
Umschaltzeit [1] Switching time [1]		≤ 100 ms
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 500.000
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C
Gewicht Weight		1.2 kg

[1] Siehe Anmerkungen auf Seite 143
See notes on page 143



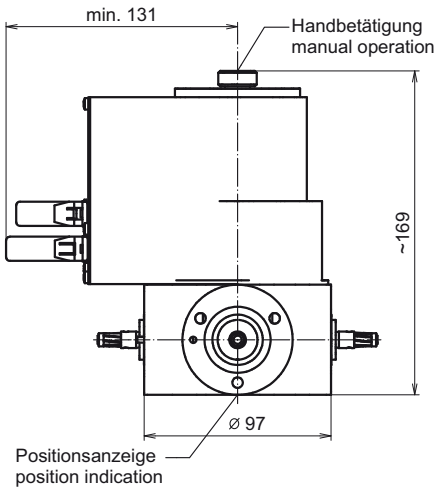
2-WEGE SCHALTER MIT 7/8" EIA ANSCHLÜSSEN
2-WAY SWITCHES WITH 7/8" EIA CONNECTORS

- Motorantrieb
- optische Positionsanzeige
- Handbetätigung
- voreilende Interlock-Kontakte
- Endlagen-Signalkontakte

- motor drive
- optical position indicator
- manual operation
- advanced interlock contacts
- end position signal contacts

Bestellnummer Part number		**BN 51 26 98**	**BN 51 26 97**
Anschlüsse Connectors		7/8" EIA	
Frequenzbereich Frequency range		0 - 3.5 GHz	
Prüfspannung [1] Proof voltage [1]		≤ 3.5 kV	
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 860 MHz	≤ 8.0 kW ≤ 5.0 kW ≤ 2.5 kW	
VSWR	100 MHz 230 MHz 860 MHz	≤ 1.02 ≤ 1.02 ≤ 1.04	
Übersprechdämpfung Isolation	100 MHz 230 MHz 860 MHz	≥ 80 dB	
Durchgangsdämpfung Insertion loss		≤ 0.03 dB	
Betriebsspannung Operating voltage		230 VAC ± 10 % 50 - 60 Hz	
Steuerspannung Control voltage		8 - 31 VDC	230 VAC ± 10 % 50 - 60 Hz
Stromaufnahme Operating current		≤ 0.5 A	
Umschaltzeit [1] Switching time [1]		≤ 120 ms	
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 250.000	
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C	
Gewicht Weight		2.5 kg	

[1] Siehe Anmerkungen auf Seite 143
See notes on page 143



Data subject to change without notice – Edition E

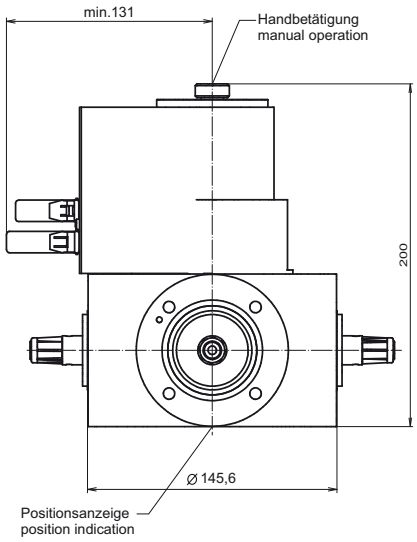
2-WEGE SCHALTER MIT 1 5/8" EIA ANSCHLÜSSEN
2-WAY SWITCHES WITH 1 5/8" EIA CONNECTORS

- Motorantrieb
- optische Positionsanzeige
- Handbetätigung
- voreilende Interlock-Kontakte
- Endlagen-Signalkontakte

- motor drive
- optical position indicator
- manual operation
- advanced interlock contacts
- end position signal contacts

Bestellnummer Part number		**BN 64 00 82**	**BN 64 00 81**
Anschlüsse Connectors		1 5/8" EIA	
Frequenzbereich Frequency range		0 - 2.0 GHz	
Prüfspannung [1] Proof voltage [1]		≤ 5.1 kV	
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 860 MHz	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW	
VSWR	100 MHz 230 MHz 860 MHz	≤ 1.03 ≤ 1.03 ≤ 1.05	
Übersprechdämpfung Isolation	100 MHz 230 MHz 860 MHz	≥ 80 dB	
Durchgangsdämpfung Insertion loss		≤ 0.05 dB	
Betriebsspannung Operating voltage		230 VAC ± 10 % 50 - 60 Hz	
Steuerspannung Control voltage		8 - 31 VDC	230 VAC ± 10 % 50 - 60 Hz
Stromaufnahme Operating current		≤ 0.5 A	
Umschaltzeit [1] Switching time [1]		≤ 120 ms	
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 250.000	
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C	
Gewicht Weight		5.0 kg	

[1] Siehe Anmerkungen auf Seite 143
See notes on page 143



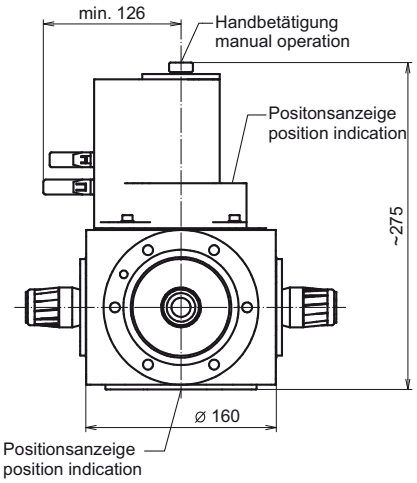
2-WEGE SCHALTER MIT 3 1/8" EIA ANSCHLÜSSEN
2-WAY SWITCHES WITH 3 1/8" EIA CONNECTORS

- Motorantrieb
- optische Positionsanzeige
- Handbetätigung
- voreilende Interlock-Kontakte
- Endlagen-Signalkontakte

- motor drive
- optical position indicator
- manual operation
- advanced interlock contacts
- end position signal contacts

Bestellnummer Part number		**BN 94 19 18**	**BN 94 19 17**
Anschlüsse Connectors		3 1/8" EIA	
Frequenzbereich Frequency range		0 - 860 MHz	
Prüfspannung [1] Proof voltage [1]		≤ 13.3 kV	
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 860 MHz	≤ 73 kW ≤ 48 kW ≤ 25 kW	
VSWR	100 MHz 230 MHz 860 MHz	≤ 1.03 ≤ 1.03 ≤ 1.05	
Übersprechdämpfung Isolation	100 MHz 230 MHz 860 MHz	≥ 75 dB	
Durchgangsdämpfung Insertion loss		≤ 0.05 dB	
Betriebsspannung Operating voltage		230 VAC ± 10 % 50 - 60 Hz	
Steuerspannung Control voltage		8 - 31 VDC	230 VAC ± 10 % 50 - 60 Hz
Stromaufnahme Operating current		≤ 1.0 A	
Umschaltzeit [1] Switching time [1]		≤ 200 ms	
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 250.000	
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C	
Gewicht Weight		10.5 kg	

[1] Siehe Anmerkungen auf Seite 143
See notes on page 143



Data subject to change without notice – Edition E

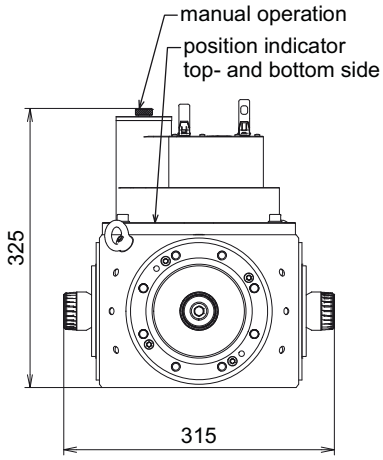
2-WEGE SCHALTER MIT 4 1/2" EIA ANSCHLÜSSEN
2-WAY SWITCHES WITH 4 1/2" EIA CONNECTORS

- Motorantrieb
- optische Positionsanzeige
- Handbetätigung
- voreilende Interlock-Kontakte
- Endlagen-Signalkontakte

- motor drive
- optical position indicator
- manual operation
- advanced interlock contacts
- end position signal contacts

Bestellnummer Part number		**BN 94 19 44**
Anschlüsse Connectors		4 1/2" EIA 339 IEC 50-105
Frequenzbereich Frequency range		0 - 860 MHz
Prüfspannung [1] Proof voltage [1]		≤ 16.0 kV
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 860 MHz	≤ 100 kW ≤ 70 kW ≤ 38 kW
VSWR	100 MHz 230 MHz 860 MHz	≤ 1.04 ≤ 1.04 ≤ 1.06
Übersprechdämpfung Isolation	100 MHz 230 MHz 860 MHz	≥ 80 dB ≥ 80 dB ≥ 70 dB
Durchgangsdämpfung Insertion loss		≤ 0.03 dB
Betriebsspannung Operating voltage		230 VAC ± 10 % 50 - 60 Hz
Steuerspannung Control voltage		8 - 31 VDC
Stromaufnahme Operating current		≤ 1.5 A
Umschaltzeit [1] Switching time [1]		≤ 1.0 s
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 250.000
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C
Gewicht Weight		26.5 kg

[1] Siehe Anmerkungen auf Seite 143
See notes on page 143



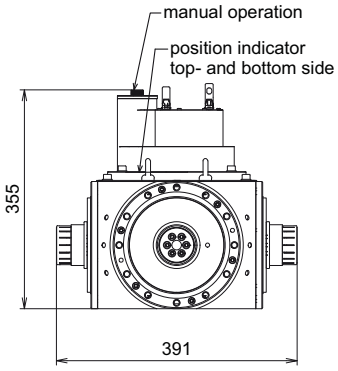
2-WEGE SCHALTER MIT 6 1/8" EIA ANSCHLÜSSEN
2-WAY SWITCHES WITH 6 1/8" EIA CONNECTORS

- Motorantrieb
- optische Positionsanzeige
- Handbetätigung
- voreilende Interlock-Kontakte
- Endlagen-Signalkontakte

- motor drive
- optical position indicator
- manual operation
- advanced interlock contacts
- end position signal contacts

Bestellnummer Part number		**BN 94 19 89**
Anschlüsse Connectors		6 1/8" EIA
Frequenzbereich Frequency range		0 - 800 MHz
Prüfspannung [1] Proof voltage [1]		≤ 18.6 kV
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 800 MHz	≤ 170 kW ≤ 110 kW ≤ 60 kW
VSWR	100 MHz 230 MHz 800 MHz	≤ 1.06 ≤ 1.06 ≤ 1.08
Übersprechdämpfung Isolation	100 MHz 230 MHz 800 MHz	≥ 75 dB ≥ 75 dB ≥ 70 dB
Durchgangsdämpfung Insertion loss		≤ 0.03 dB
Betriebsspannung Operating voltage		230 VAC ± 10 % 50 - 60 Hz
Steuerspannung Control voltage		8 - 31 VDC
Stromaufnahme Operating current		≤ 1.5 A
Umschaltzeit [1] Switching time [1]		≤ 1.2 s
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 250.000
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C
Gewicht Weight		38.0 kg

[1] Siehe Anmerkungen auf Seite 143
See notes on page 1433



Data subject to change without notice – Edition E

2-WEGE AUFSTECKSCHALTER 1 5/8" USL-D FÜR UMSCHALTFELDER

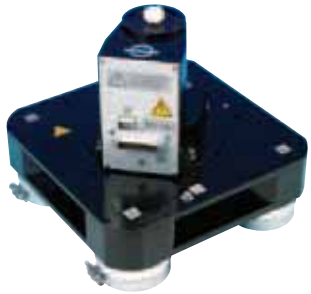
2-WAY PLUG-IN SWITCHES 1 5/8" USL-D FOR PATCH PANELS

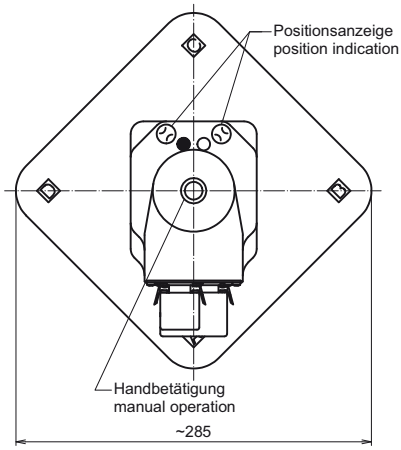
- Motorantrieb
- optische Positionsanzeige
- Handbetätigung
- voreilende Interlock-Kontakte
- Interlockschutz bei Entfernen des Schalters
- Verdrehschutz beim Aufsetzen
- Endlagen-Signalkontakte
- alternativer Betrieb mit Bügelsteckern möglich

- motor drive
- optical position indicator
- manual operation
- advanced interlock contacts
- interlock protection in case of switch removal
- twist protected on plug-in
- end position signal contacts
- alternative operation with U-links possible

Bestellnummer Part number		**BN 55 30 64**	**BN 55 30 65**
Anschlüsse Connectors		1 5/8" USL-D	
Frequenzbereich Frequency range		0 - 860 MHz	
Prüfspannung [1] Proof voltage [1]		≤ 7.0 kV	
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 860 MHz	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW	
VSWR	100 MHz 230 MHz 860 MHz	≤ 1.04	
Übersprechdämpfung Isolation	100 MHz 230 MHz 860 MHz	≥ 80 dB ≥ 80 dB ≥ 70 dB	
Durchgangsdämpfung Insertion loss	860 MHz	≤ 0.1 dB	
Betriebsspannung Operating voltage		230 VAC ± 10 % 50 - 60 Hz	
Steuerspannung Control voltage		8 - 31 VDC	230 VAC ± 10 % 50 - 60 Hz
Stromaufnahme Operating current		≤ 1.0 A	
Umschaltzeit Switching time		≤ 200 ms	
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 250.000	
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C	
Gewicht Weight		5.0 kg	

[1] Siehe Anmerkungen auf Seite 143
See notes on page 143





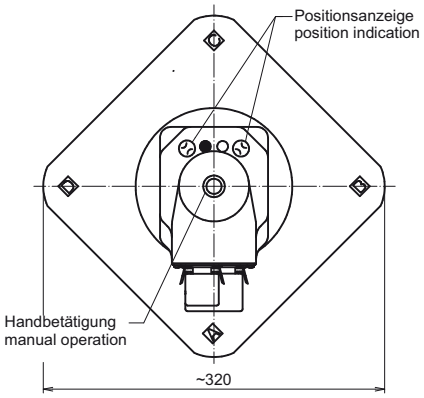
2-WEGE AUFSTECKSCHALTER 29,5 - 68 USL-D FÜR UMSCHALTFELDER

2-WAY PLUG-IN SWITCHES 29.5 - 68 USL-D FOR PATCH PANELS

- Motorantrieb
- optische Positionsanzeige
- Handbetätigung
- voreilende Interlock-Kontakte
- Interlockschutz bei Entfernen des Schalters
- Verdrehschutz beim Aufsetzen
- Endlagen-Signalkontakte
- alternativer Betrieb mit Bügelsteckern möglich

- motor drive
- optical position indicator
- manual operation
- advanced interlock contacts
- interlock protection in case of switch removal
- twist protected on plug-in
- end position signal contacts
- alternative operation with U-links possible

Bestellnummer Part number		**BN 55 33 64**	**BN 55 33 65**
Anschlüsse Connectors		29.5 - 68 USL-D	
Frequenzbereich Frequency range		0 - 860 MHz	
Prüfspannung [1] Proof voltage [1]		≤ 8.1 kV	
Effektive Leistung [1] Average Power [1]	100 MHz 230 MHz 860 MHz	≤ 41 kW ≤ 21 kW ≤ 14 kW	
VSWR	100 MHz 230 MHz 860 MHz	≤ 1.04	
Übersprechdämpfung Isolation	100 MHz 230 MHz 860 MHz	≥ 80 dB ≥ 80 dB ≥ 70 dB	
Durchgangsdämpfung Insertion loss	860 MHz	≤ 0.1 dB	
Betriebsspannung Operating Voltage		230 VAC ± 10 % 50 - 60 Hz	
Steuerspannung Control voltage		8 - 31 VDC	230 VAC ± 10 % 50 - 60 Hz
Stromaufnahme Operating current		≤ 1.0 A	
Umschaltzeit Switching time		≤ 200 ms	
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 250.000	
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C	
Gewicht Weight		9.0 kg	



[1] Siehe Anmerkungen auf Seite 143
See notes on page 143

Data subject to change without notice – Edition E

2-WEGE AUFSTECKSCHALTER 43 - 98 USL-D FÜR UMSCHALTFELDER

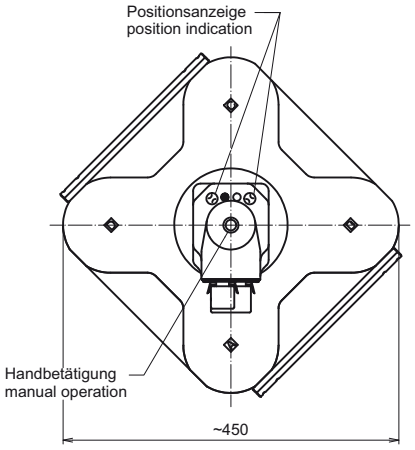
2-WAY PLUG-IN SWITCHES 43 - 98 USL-D FOR PATCH PANELS

- Motorantrieb
- optische Positionsanzeige
- Handbetätigung
- voreilende Interlock-Kontakte
- Interlockschutz bei Entfernen des Schalters
- Verdrehschutz beim Aufsetzen
- Endlagen-Signalkontakte
- alternativer Betrieb mit Bügelsteckern möglich

- motor drive
- optical position indicator
- manual operation
- advanced interlock contacts
- interlock protection in case of switch removal
- twist protected on plug-in
- end position signal contacts
- alternative operation with U-links possible

Bestellnummer Part number		**BN 55 36 64**	**BN 55 36 65**
Anschlüsse Connectors		43 - 98 USL-D	
Frequenzbereich Frequency range		0 - 860 MHz	
Prüfspannung [1] Proof voltage [1]		≤ 14.5 kV	
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 860 MHz	≤ 82 kW ≤ 42 kW ≤ 28 kW	
VSWR	100 MHz 230 MHz 860 MHz	≤ 1.04	
Übersprechdämpfung Isolation	100 MHz 230 MHz 860 MHz	≥ 80 dB ≥ 80 dB ≥ 60 dB	
Durchgangsdämpfung Insertion loss		≤ 0.1 dB	
Betriebsspannung Operating voltage		230 VAC ± 10 % 50 - 60 Hz	
Steuerspannung Control voltage		8 - 31 VDC	230 VAC ± 10 % 50 - 60 Hz
Stromaufnahme Operating current		≤ 1.0 A	
Umschaltzeit [1] Switching time [1]		≤ 500 ms	
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 250.000	
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C	
Gewicht Weight		22.0 kg	

[1] Siehe Anmerkungen auf Seite 143
See notes on page 143



N+1 SCHALTSYSTEME FÜR RESERVESENDERBETRIEB / BISTABIL

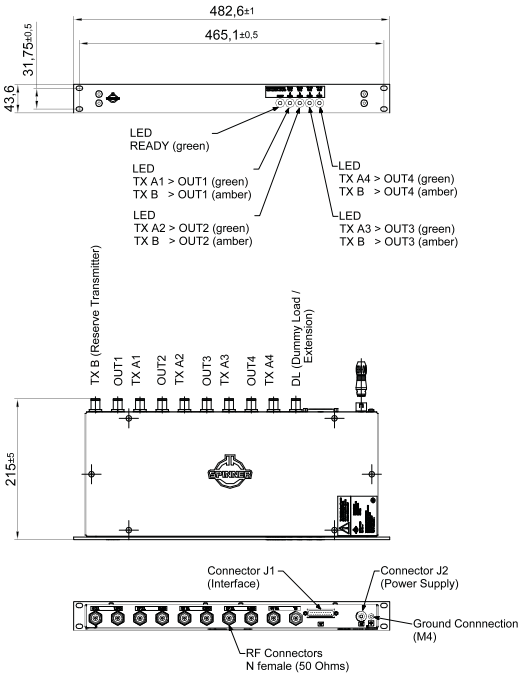
N+1 SWITCHING UNITS FOR STAND BY TRANSMITTER OPERATION / LATCHING

- Hubmagnetantrieb
- ersetzt zwei/vier 2-Wege Schalter
- anschlussfertig verschaltet
- Schaltzustandsanzeige auf der Frontplatte
- modular erweiterbar
- 19" Einschub, 1 HE
- leichter Einbau mit oder ohne Frontplatte

- lifting magnet drive
- replaces two/four 2-way switches
- ready for operation
- indication of the switching status at the front plate
- modular expandabel
- 19" drawer, 1 RU
- easy installation with or without front plate

Bestellnummer **Part number**		**BN 51 26 63 (2+1)** **BN 51 26 65 (4+1)**
Anschlüsse Connectors		N Kuppler N female
Frequenzbereich Frequency range		0 - 1500 MHz
Prüfspannung [1] Proof voltage [1]		≤ 1.0 kV
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 860 MHz 1500 MHz	≤ 280 W ≤ 200 W ≤ 130 W ≤ 95 W
VSWR	860 MHz 860 MHz 1500 MHz 1500 MHz	≤ 1.06 shortest path ≤ 1.12 longest path ≤ 1.17 shortest path ≤ 1.22 longest path
Übersprechdämpfung Isolation	860 MHz 1500 MHz	≥ 45 dB ≥ 40 dB
Durchgangsdämpfung Insertion loss	860 MHz 860 MHz 1500 MHz 1500 MHz	≤ 0.25 shortest path ≤ 0.60 longest path ≤ 0.35 shortest path ≤ 0.70 longest path
Betriebsspannung Operating voltage		10.8 - 26.4 VDC
Steuerspannung Control voltage		8 - 28 VDC
Leistungsaufnahme beim Schalten Power consumption while switching		20 W
Umschaltzeit Switching time		≤ 100 ms
Schaltcharakteristik Switching characteristic		bistabil latching
Lebensdauer (Schaltungen) Mechanical life (cycles)		≥ 100.000
Umgebungstemperatur Ambient temperature		-10 °C ≤ ϑ ≤ +45 °C
Gewicht Weight		BN 51 26 63 ca. 3.5 kg BN 51 26 65 ca. 5.0 kg

[1] Siehe Anmerkungen auf Seite 143
See notes on page 143



BN 51 26 65

ROHRLEITUNGEN & KABELSTECKER
RIGID LINES & CABLE CONNECTORS

SPINNER bietet verschiedene Rohrleitungssysteme an: das EIA-System, das SMS-System und das Bördeltechnik-System (BT).
Die angegebenen technischen Daten gelten auch für Rohrleitungswinkel, die gegenüber den einschlägigen Normen deutlich bessere Werte aufweisen. Die Prüfspannungen beziehen sich auf Meereshöhe.
Zur Reduzierung der Außenleiter-Temperatur, empfehlen wir bei einer Leistung oberhalb von 80 % der angegebenen maximalen, effektiven Leistung, die Rohrleitung mit einem schwarzen, hitzebeständigen Lack zu versehen.

EIA-System
Diese allgemein unter dem Begriff „EIA-Flansche“ bekannten Flansch-Steckverbinder sind genormt nach EIA STD RS-225, 339 IEC, DIN EN 122150 und MIL-F 24044. Sie benötigen zur Verbindung ein Kupplungselement und sind besonders geeignet für druckdichte Übertragungssysteme und für die Verlegung im Freien.

SMS-System
Das SPINNER Schnellmontagesystem SMS basiert auf den internationalen Rohrleitungsstandards nach EIA STD RS 225 bzw. 339 IEC bzw. DIN EN 122150.
Die einzelnen Bauteile werden durch Kupplungselemente mit Schellenbefestigung verbunden. Der Vorteil des SMS-Systems liegt darin, dass Rohrleitungen auf der Baustelle vom Kunden selbst auf die gewünschte Länge zugeschnitten werden können, ohne dass Bördeln oder Löten erforderlich ist. Dadurch ergibt sich eine äußerst einfache Montage, für die keine Spezialwerkzeuge nötig sind.
Das SPINNER SMS-System ist ausschließlich für Innenraummontage vorgesehen.

Bördeltechnik-System (BT)
Das Außenleiterrohr wird mit einem Werkzeug (SPINNER Bördelgerät) umgebördelt. Die Verbindung der einzelnen Bauteile wird über Kupplungselemente hergestellt. Die Außenleiter-Kontaktierung erfolgt über einen metallischen Haltering, der am Umfang der Isolierstütze des Kupplungselementes montiert ist. Diese äußerst stabile Verbindung garantiert hohe HF-Dichtigkeit und reproduzierbare elektrische Längen. Das 52-120 Bördeltechnik-System ist für Innenraummontage vorgesehen und ist für die maximal übertragbare Leistung bis 860 MHz konzipiert.

Bei der Montage gerader Rohrleitungen ist zu beachten, dass ab einer bestimmten Leitungslänge der Einbau einer oder mehrerer Mittelstützen erforderlich ist, um ein Durchhängen des Innenleiters zu vermeiden.

SPINNER delivers different types of rigid line systems called EIA system, SMS system and flaring technicque system (BT).
The indicated technical data are also valid for the rigid line elbows, which have a remarkable better performance related to the values in the relevant international standards. The proof voltage values refer to sea level.
For a RF power more than 80 % of the indicated maximum average power we recommend to paint the rigid line with a black heat resistant varnish to reduce the outer conductor temperature.

EIA system
Coaxial flange connectors, generally known as “EIA flanges”, are connected by a coupling element. The flange connector system is standardized according to EIA STD RS-225, 339 IEC, DIN EN 122150 and MIL-F 24044. The EIA flange connectors are excellently qualified for pressurized systems and for outdoor installation.

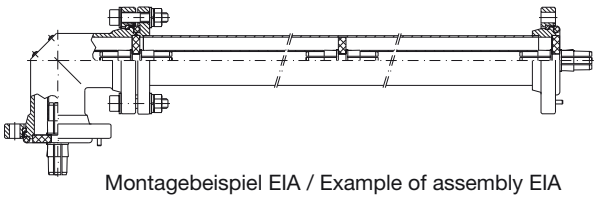
SMS system
The SPINNER quick clamp system called SMS is based on the international rigid line standards like EIA STD RS 225, 339 IEC and DIN EN 122150.

The different parts are connected by coupling elements and fixed together with clamps. The advantage of the SMS system is that the customer can easily cut the rigid line to length on site, without flaring or brazing. The assembly is therefore very simple and no special tools are required.

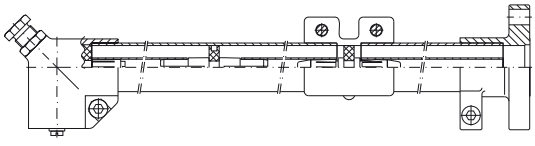
The SMS system is provided solely for indoor installation.

Flaring technique system (BT)
The outer conductor tube is flared by using a SPINNER flaring tool. The different components are connected together with coupling elements. The electrical contact at the outer conductor is done via a metallic ring which is mounted on periphery of the insulation disc of the coupling element. The very stable connection ensures a high RF tightness and repeatable electrical length.
The 52-120 BT flaring technique system is provided for indoor application and is designed to handle the maximum RF power up to 860 MHz.

Please take into consideration that for rigid lines inner supports are necessary depending on the wanted line length. The inner supports prevent the inner conductor from sagging.



Montagebeispiel EIA / Example of assembly EIA



Montagebeispiel SMS / Example of assembly SMS

Data subject to change without notice – Edition E

ROHRLEITUNGEN & KABELSTECKER
RIGID LINES & CABLE CONNECTORS

SPINNER liefert je nach Kabelgröße und Kabeltyp **Steckverbinder** in „Cut And Fit“ (CAF®) oder Premium Ausführung. „Cut And Fit“ – Monobloc-Steckverbinder sind einteilige Steckverbinder, die zur Montage auf das Kabel nicht zerlegt werden müssen. Dadurch wird eine einfache und schnelle Montage garantiert.
Premium Steckverbinder haben eine Flanschverbindung zwischen Steckerkopf und Kabelabfangung und ermöglichen eine unkomplizierte Montage, selbst unter schwierigsten Montagebedingungen.

Die Abdichtung der Steckverbinder erfolgt durch Einspritzen des dauerelastischen Dichtungswerkstoffes **Plast 2000®** in die Kabelabfangung. Plast 2000® wurde speziell für die Verwendung in Hochfrequenzarmaturen entwickelt und schließt Störungen mit Sicherheit aus.

Eine Belüftung der HELIFLEX-Kabel mit Gas oder trockener Luft durch den Steckverbinder ist bei Verwendung geeigneter SPINNER **Gasanschlüsse** möglich.

Anmerkung:
Bei DVB- oder DAB-Betrieb wird die übertragbare Leistung entweder durch die Prüfspannung, unter Einbeziehung des Crestfaktors, oder durch die effektive Leistung begrenzt. Bei Mehrsenderbetrieb ist die Summe der Einzel-Prüfspannungen zu berücksichtigen. Letzteres gilt auch für Analog-Betrieb.

SPINNER delivers **cable connectors** as Cut And Fit (CAF®) or as premium versions, depending on the cable size and connector type.
Cut And Fit monobloc cable connectors are connectors made of one part that need not be dismantled to attach them to the cable. This feature ensures easy and quick assembly. Premium cable connectors have a flange connection between the connector head and the cable clamp that allows easy assembly even under the most unfavorable assembly conditions.

The connectors are sealed by injecting the cable clamp with special permanently elastic sealing material **Plast 2000®**. Plast 2000® has been developed for use in radio frequency components and rules out any faults.

HELIFLEX cables can be ventilated by gas or by dried air through the connector if suitable SPINNER **gas inlets** are used.

Note:
For DVB or DAB operation please note that the transmittable power is limited either by the proof voltage, taking the crest factor into account, or by the average power. For multitransmitter operation please note the sum of the individual proof voltages. The same applies to analogue operating mode.

EIA COMPONENTS | SMS/BT COMPONENTS

Größe Size	Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature		
	100 MHz	230 MHz	860 MHz
7/8" EIA	≤ 7.60 kW	≤ 5.0 kW	≤ 2.6 kW
1 5/8" EIA	≤ 20.0 kW	≤ 13.5 kW	≤ 7.0 kW
3 1/8" EIA	≤ 67.0 kW	≤ 44.0 kW	≤ 23.0 kW
4 1/2" EIA (339 IEC 50-105)	≤ 112.0 kW	≤ 74.0 kW	≤ 38.0 kW
6 1/8" EIA	≤ 224.0 kW	≤ 148.0 kW	≤ 78.0 kW (800 MHz)
7/8" SMS	≤ 7.60 kW	≤ 5.0 kW	≤ 2.6 kW
1 5/8" SMS-1	≤ 19.60 kW	≤ 13.0 kW	≤ 7.0 kW
1 5/8" SMS-2	≤ 20.0 kW	≤ 13.5 kW	≤ 7.0 kW
3 1/8" SMS	≤ 63.0 kW	≤ 42.0 kW	≤ 22.0 kW
4 1/2" SMS	≤ 106.0 kW	≤ 70.0 kW	≤ 37.0 kW
52-120 SMS	≤ 140.0 kW	≤ 92.0 kW	≤ 47.0 kW
52-120 BT	≤ 142.0 kW	≤ 93.0 kW	≤ 48.0 kW
6 1/8" SMS	≤ 213.0 kW	≤ 140.0 kW	≤ 72.0 kW/800 MHz

ROHRLEITUNGSKOMPONENTEN 7/8" EIA
RIGID LINE COMPONENTS 7/8" EIA

- sehr stabiles Rohrleitungssystem
- geringe Durchgangsdämpfung
- niedriges VSWR
- PTFE-Isolation
- geeignet für druckdichte Systeme
- für Außenmontage

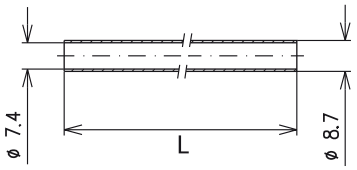
- very stable rigid line system
- low insertion loss
- low VSWR
- PTFE insulation
- designed for pressure tight systems
- for outdoor application

		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	0.28 kg 0.57 kg	**BN A0 24 02** **BN K2 02 65**
Außenleiterrohr (Kupfer) Outer conductor tube (copper)	L = 2 m L = 4 m	1.35 kg 2.70 kg	**BN A0 24 03** **BN K2 17 51**
Mittelstütze Inner support		0.01 kg	**BN 54 27 68**
Starrer Flansch zum Auflöten Fixed flange for brazing		0.17 kg	**BN 00 61 21**
Kupplungselement inkl. Schraubensatz Coupling element incl. screw set		0.05 kg	**BN 91 17 15**
90° Winkel 90° Elbow		0.59 kg	**BN 83 71 05**

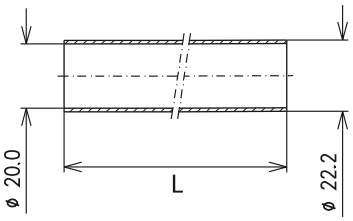
Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		6.3 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		3.8 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 5.3 GHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 7.6 kW ≤ 5.0 kW ≤ 2.6 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	1.21 1.84 3.55

Data subject to change without notice – Edition E

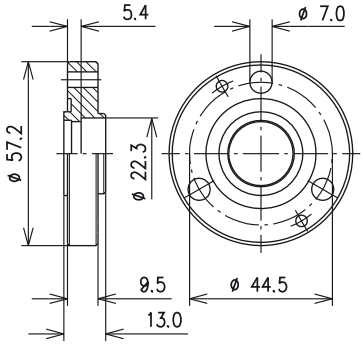
ROHRLEITUNGSKOMPONENTEN 7/8" EIA
RIGID LINE COMPONENTS 7/8" EIA



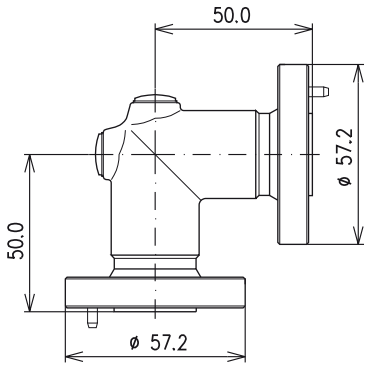
Innenleiterrohr
Inner conductor tube
BN A0 24 02; BN K2 02 65



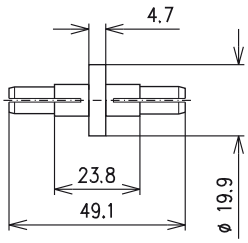
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 03; BN K2 17 51



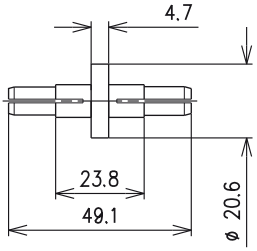
Starrer Flansch zum Auflöten
Fixed flange for brazing
BN 00 61 21



90° Winkel
90° Elbow
BN 83 71 05



Mittelstütze
Inner support
BN 54 27 68



Kupplungselement
Coupling element
BN 91 17 15

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
1.0 m ≤ L ≤ 2.0 m	1
2.0 m < L ≤ 3.0 m	2
3.0 m < L ≤ 4.0 m	3

ROHRLEITUNGSKOMPONENTEN 1 5/8" EIA

RIGID LINE COMPONENTS 1 5/8" EIA

- sehr stabiles Rohrleitungssystem
- geringe Durchgangsdämpfung
- niedriges VSWR
- PTFE-Isolation
- geeignet für druckdichte Systeme
- für Außenmontage

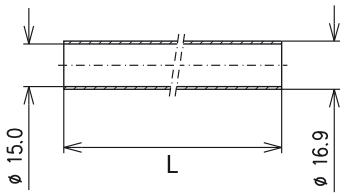
- very stable rigid line system
- low insertion loss
- low VSWR
- PTFE insulation
- designed for pressure tight systems
- for outdoor application

		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	0.89 kg 1.78 kg	**BN A0 24 06** **BN K1 96 40**
Außenleiterrohr (Kupfer) Outer conductor tube (copper)	L = 2 m L = 4 m	2.78 kg 5.56 kg	**BN A0 24 07** **BN K1 96 08**
Mittelstütze Inner support		0.04 kg	**BN 85 99 06**
Starrer Flansch zum Auflöten Fixed flange for brazing		0.42 kg	**BN 00 61 11**
Kupplungselement inkl. Schraubensatz Coupling element incl. screw set		0.16 kg	**BN 91 83 11**
90° Winkel 90° Elbow		1.36 kg	**BN 93 85 20**

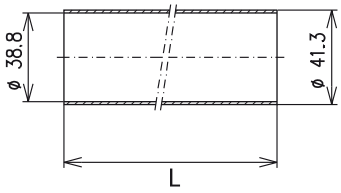
Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		3.2 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		7.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 2.7 GHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	0.63 0.95 1.83

Data subject to change without notice – Edition E

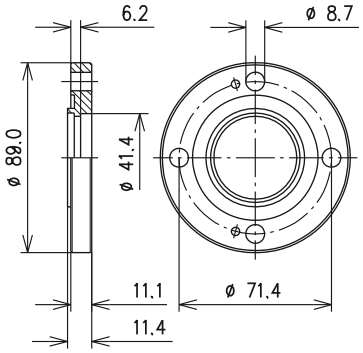
ROHRLEITUNGSKOMPONENTEN 1 5/8" EIA
RIGID LINE COMPONENTS 1 5/8" EIA



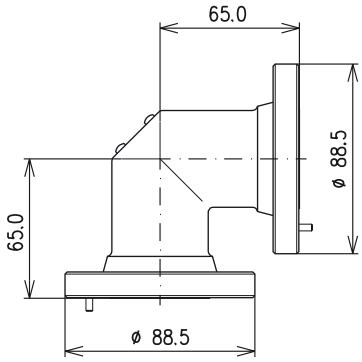
Innenleiterrohr
Inner conductor tube
BN A0 24 06; BN K1 96 40



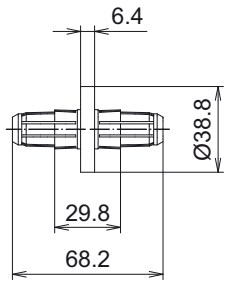
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 07; BN K1 96 08



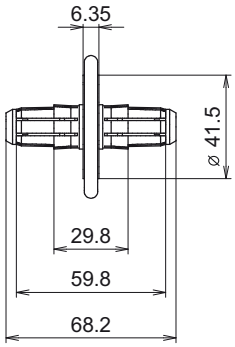
Starrer Flansch zum Auflöten
Fixed flange for brazing
BN 00 61 11



90° Winkel
90° Elbow
BN 93 85 20



Mittelstütze
Inner support
BN 85 99 06



Kupplungselement
Coupling element
BN 91 83 11

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
1.4 m ≤ L ≤ 2.8 m	1
2.8 m < L ≤ 4.0 m	2

ROHRLEITUNGSKOMPONENTEN 3 1/8" EIA

RIGID LINE COMPONENTS 3 1/8" EIA

- sehr stabiles Rohrleitungssystem
- geringe Durchgangsdämpfung
- niedriges VSWR
- PTFE-Isolation
- geeignet für druckdichte Systeme
- für Außenmontage

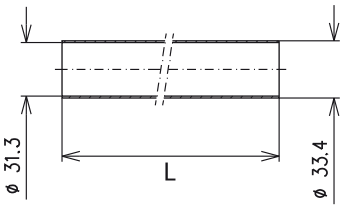
- very stable rigid line system
- low insertion loss
- low VSWR
- PTFE insulation
- designed for pressure tight systems
- for outdoor application

		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	1.90 kg 3.80 kg	**BN A0 24 15** **BN K2 27 70**
Außenleiterrohr (Kupfer) Outer conductor tube (copper)	L = 2 m L = 4 m	5.90 kg 11.80 kg	**BN A0 24 16** **BN K2 65 69**
Mittelstütze Inner support		0.27 kg	**BN 87 00 03**
Starrer Flansch zum Auflöten Fixed flange for brazing		0.75 kg	**BN 00 49 42**
Kupplungselement inkl. Schraubensatz Coupling element incl. screw set		0.58 kg	**BN 91 87 10**
90° Winkel 90° Elbow		3.22 kg	**BN 92 19 20**

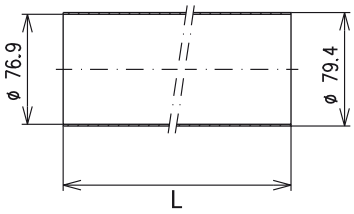
Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		1.6 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		14.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 1.3 GHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 67.0 kW ≤ 44.0 kW ≤ 23.0 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	0.32 0.48 0.92

Data subject to change without notice – Edition E

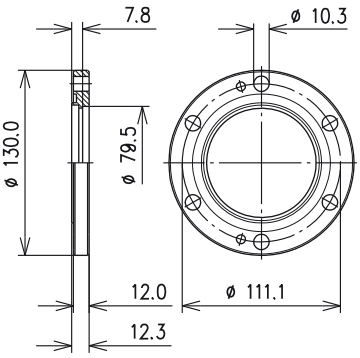
ROHRLEITUNGSKOMPONENTEN 3 1/8" EIA
RIGID LINE COMPONENTS 3 1/8" EIA



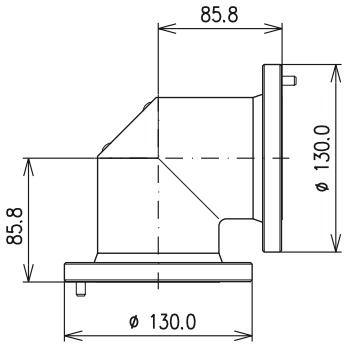
Innenleiterrohr
Inner conductor tube
BN A0 24 15; BN K2 27 70



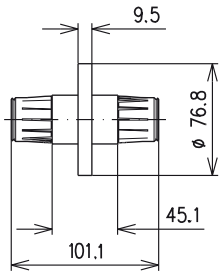
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 16; BN K2 65 69



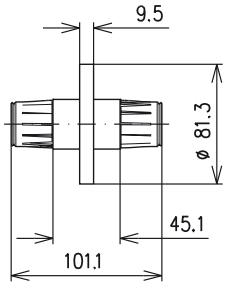
Starrer Flansch zum Auflöten
Fixed flange for brazing
BN 00 49 42



90° Winkel
90° Elbow
BN 92 19 20



Mittelstütze
Inner support
BN 87 00 03



Kupplungselement
Coupling element
BN 91 87 10

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
2.0 m ≤ L ≤ 4.0 m	1

ROHRLEITUNGSKOMPONENTEN 4 1/2" EIA [1)]

RIGID LINE COMPONENTS 4 1/2" EIA [1)]

- sehr stabiles Rohrleitungssystem
- geringe Durchgangsdämpfung
- niedriges VSWR
- PTFE-Isolation
- geeignet für druckdichte Systeme
- für Außenmontage

- very stable rigid line system
- low insertion loss
- low VSWR
- PTFE insulation
- designed for pressure tight systems
- for outdoor application

		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	2.50 kg 5.00 kg	**BN A0 24 21** **BN K2 62 91**
Außenleiterrohr (Kupfer) Outer conductor tube (copper)	L = 2 m L = 4 m	8.80 kg 17.60 kg	**BN A0 24 22** **BN K2 08 52**
Mittelstütze Inner support		0.60 kg	**BN 64 86 02**
Starrer Flansch zum Auflöten Fixed flange for brazing		1.29 kg	**BN 64 86 01**
Kupplungselement inkl. Schraubensatz Coupling element incl. screw set		1.07 kg	**BN 82 28 10**
90° Winkel 90° Elbow		6.10 kg	**BN 70 40 01**

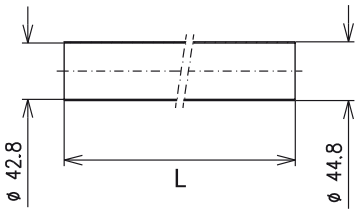
Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		1.2 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		19.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 1.0 GHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 112.0 kW ≤ 74.0 kW ≤ 38.0 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	0.24 0.36 0.69

[1)] 339 IEC 50-105

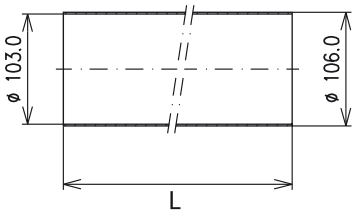
Data subject to change without notice – Edition E

ROHRLEITUNGSKOMPONENTEN 4 1/2" EIA [1)]

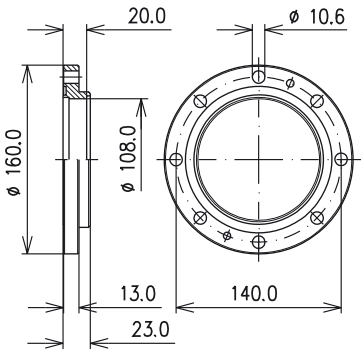
RIGID LINE COMPONENTS 4 1/2" EIA [1)]



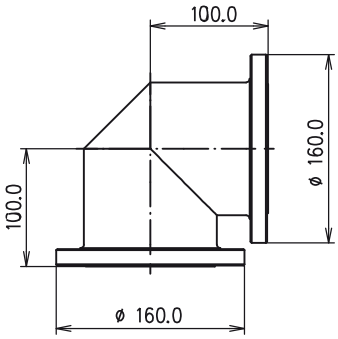
Innenleiterrohr
Inner conductor tube
BN A0 24 21; BN K2 62 91



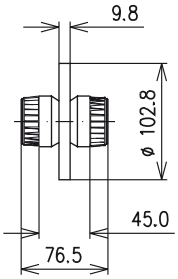
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 22; BN K2 08 52



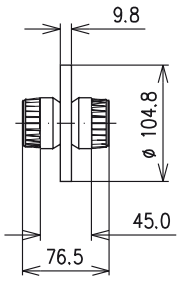
Starrer Flansch zum Auflöten
Fixed flange for brazing
BN 64 86 01



90° Winkel
90° Elbow
BN 70 40 01



Mittelstütze
Inner support
BN 64 86 02



Kupplungselement
Coupling element
BN 82 28 10

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
2.5 m ≤ L ≤ 4.0 m	1

[1)] 339 IEC 50-105

ROHRLEITUNGSKOMPONENTEN 6 1/8" EIA

RIGID LINE COMPONENTS 6 1/8" EIA

- sehr stabiles Rohrleitungssystem
- geringe Durchgangsdämpfung
- niedriges VSWR
- PTFE-Isolation
- geeignet für druckdichte Systeme
- für Außenmontage

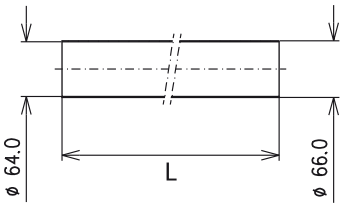
- very stable rigid line system
- low insertion loss
- low VSWR
- PTFE insulation
- designed for pressure tight systems
- for outdoor application

		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	3.52 kg 7.04 kg	**BN A0 24 27** **BN K2 33 34**
Außenleiterrohr (Kupfer) Outer conductor tube (copper)	L = 2 m L = 4 m	15.81 kg 31.62 kg	**BN A0 24 28** **BN K2 65 68**
Mittelstütze Inner support		2.45 kg	**BN 53 27 84**
Starrer Flansch zum Auflöten Fixed flange for brazing		1.75 kg	**BN 00 85 50**
Kupplungselement inkl. Schraubensatz Coupling element incl. screw set		2.12 kg	**BN 91 93 10**
90° Winkel 90° Elbow		6.66 kg	**BN 87 32 08**

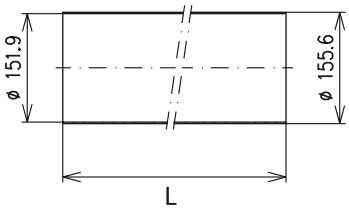
Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		0.83 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		28.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 800 MHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 800 MHz	≤ 224.0 kW ≤ 148.0 kW ≤ 78.0 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 800 MHz	0.16 0.24 0.46

Data subject to change without notice – Edition E

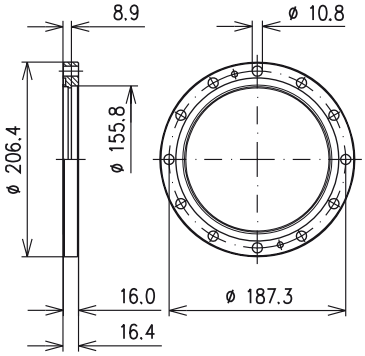
ROHRLEITUNGSKOMPONENTEN 6 1/8" EIA
RIGID LINE COMPONENTS 6 1/8" EIA



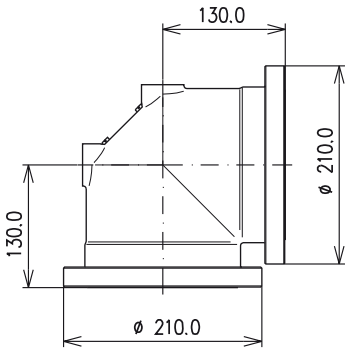
Innenleiterrohr
Inner conductor tube
BN A0 24 27; BN K2 33 34



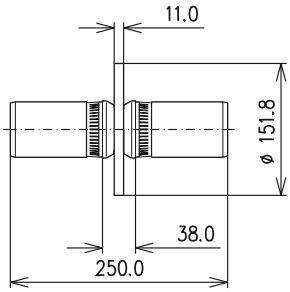
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 28; BN K2 65 68



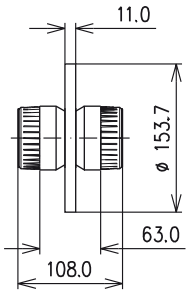
Starrer Flansch zum Auflöten
Fixed flange for brazing
BN 00 85 50



90° Winkel
90° Elbow
BN 87 32 08



Mittelstütze
Inner support
BN 53 27 84



Kupplungselement
Coupling element
BN 91 93 10

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
3.0 m ≤ L ≤ 4.0 m	1

ROHRLEITUNGSKOMPONENTEN 7/8" SMS
RIGID LINE COMPONENTS 7/8" SMS

- Außenleitersystem ohne Kontaktring, in Kupfer/ Kupferlegierung
- einfache und schnelle Montage
- keine Spezialwerkzeuge erforderlich
- PTFE-Isolation
- für Innenraummontage

- outer conductor system without contact ring in copper / copper alloy
- quick and simple assembly
- no special tools required
- PTFE insulation
- for indoor application

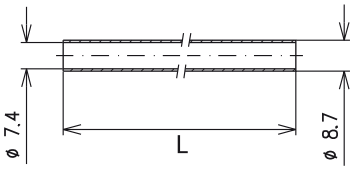
		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	0.28 kg 0.57 kg	**BN A0 24 02** **BN K2 02 65**
Außenleiterrohr (Kupfer) Outer conductor tube (copper)	L = 2 m L = 4 m	1.35 kg 2.70 kg	**BN A0 24 03** **BN K2 17 51**
Mittelstütze Inner support		0.01 kg	**BN 54 27 68**
Übergang SMS Schelle auf 7/8" EIA Adaptor SMS clamp to 7/8" EIA		0.23 kg	**BN 54 27 67**
Übergang SMS Schelle auf 7-16 Kuppler Adaptor SMS clamp to 7-16 female		0.15 kg	**BN 54 27 79**
Kupplungselement für 7/8" EIA inkl. Schraubensatz Coupling element for 7/8" EIA incl. screw set		0.05 kg	**BN 91 17 15**
Rohrleitungsverbinder Rigid line splice		0.11 kg	**BN 54 27 69**
90° Winkel 90° Elbow		0.16 kg	**BN 54 27 62**

Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		6.3 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		3.8 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 5.3 GHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 7.6 kW ≤ 5.0 kW ≤ 2.6 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	1.21 1.84 3.55

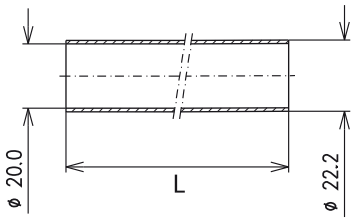
Montageanleitung Installation instruction	M 36123

Data subject to change without notice – Edition E

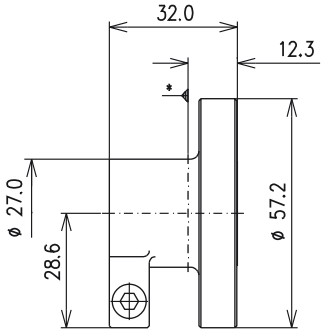
ROHRLEITUNGSKOMPONENTEN 7/8" SMS
RIGID LINE COMPONENTS 7/8" SMS



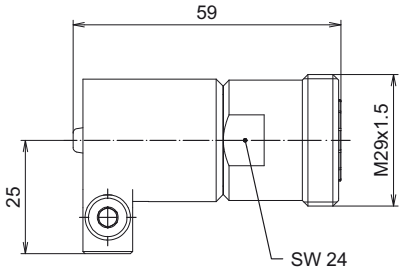
Innenleiterrohr
Inner conductor tube
BN A0 24 02; BN K2 02 65



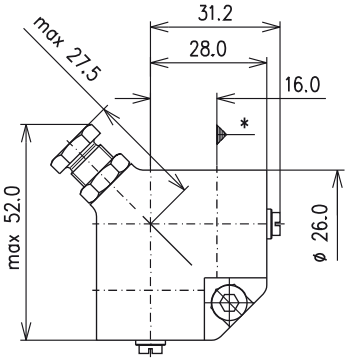
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 03; BN K2 17 51



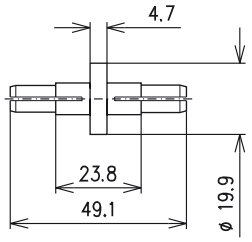
Übergang SMS Schelle auf 7/8" EIA
Adaptor SMS clamp to 7/8" EIA
BN 54 27 67



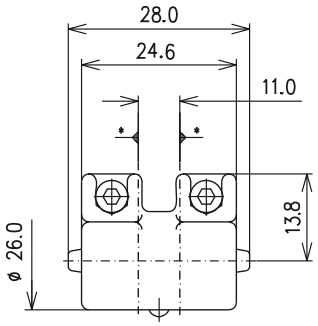
Übergang SMS Schelle auf 7-16 Kuppler
Adaptor SMS clamp to 7-16 female
BN 54 27 79



90° Winkel mit Abgleichschraube
90° Elbow with adjustment screw
BN 54 27 62



Mittelstütze
Inner support
BN 54 27 68



Rohrleitungsverbinder
Rigid line splice
BN 54 27 69

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
1.0 m ≤ L ≤ 2.0 m	1
2.0 m < L ≤ 3.0 m	2
3.0 m < L ≤ 4.0 m	3

* Bezugsebene
Reference plane

ROHRLEITUNGSKOMPONENTEN 1 5/8" SMS-1

RIGID LINE COMPONENTS 1 5/8" SMS-1

- Außenleitersystem Aluminium / Aluminiumlegierung
- einfache und schnelle Montage
- keine Spezialwerkzeuge erforderlich
- PTFE-Isolation
- für Innenraummontage

- outer conductor system aluminium / aluminium alloy
- quick and simple assembly
- no special tools required
- PTFE insulation
- for indoor application

		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	0.89 kg 1.78 kg	**BN A0 24 06** **BN K1 96 40**
Außenleiterrohr (Aluminium) Outer conductor tube (aluminium)	L = 2 m L = 4 m	0.86 kg 1.72 kg	**BN A0 24 09** **BN K2 02 01**
Mittelstütze Inner support		0.04 kg	**BN 85 99 06**
Übergang SMS-1 Schelle auf 1 5/8" EIA Adaptor SMS-1 clamp to 1 5/8" EIA		0.21 kg	**BN B1 34 87 C1000**
Kupplungselement für 1 5/8" EIA inkl. Schraubensatz Coupling element for 1 5/8" EIA incl. screw set		0.16 kg	**BN 91 83 11**
Rohrleitungsverbinder Rigid line splice		0.29 kg	**BN 53 27 04**
90° Winkel 90° Elbow		0.29 kg	**BN 53 27 02**

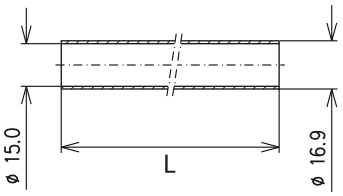
Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		3.2 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		7.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 2.7 GHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 19.6 kW ≤ 13.0 kW ≤ 7.0 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	0.75 1.13 2.19

Montageanleitung Installation instruction	M 36124

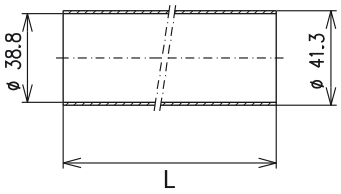
Data subject to change without notice – Edition E

ROHRLEITUNGSKOMPONENTEN 1 5/8" SMS-1

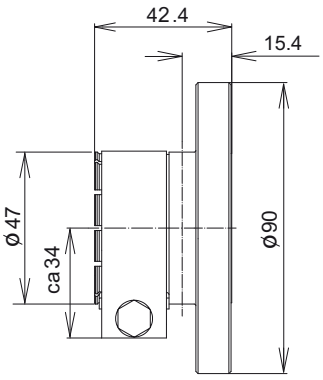
RIGID LINE COMPONENTS 1 5/8" SMS-1



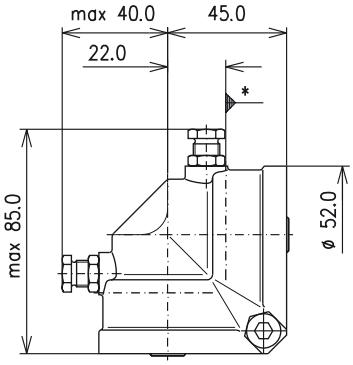
Innenleiterrohr
Inner conductor tube
BN A0 24 06; BN K1 96 40



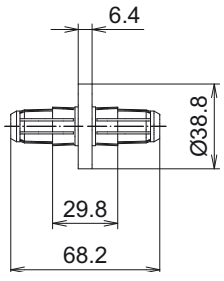
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 09; BN K2 02 01



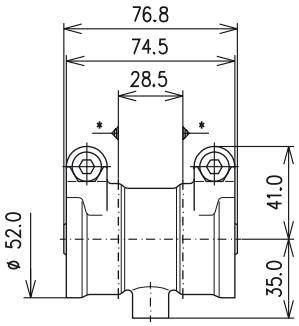
Übergang SMS-1 Schelle auf 1 5/8" EIA
Adaptor SMS-1 clamp to 1 5/8" EIA
BN B1 34 87 C1000



90° Winkel mit Abgleichschrauben
90° Elbow with adjustment screws
BN 53 27 02



Mittelstütze
Inner support
BN 85 99 06



Rohrleitungsverbinder
Rigid line splice
BN 53 27 04

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
1.4 m ≤ L ≤ 2.8 m	1
2.8 m < L ≤ 4.0 m	2

* Bezugsebene
Reference plane

ROHRLEITUNGSKOMPONENTEN 1 5/8" SMS-2

RIGID LINE COMPONENTS 1 5/8" SMS-2

- Außenleitersystem ohne Kontaktring, in Kupfer / Kupferlegierung
- einfache und schnelle Montage
- keine Spezialwerkzeuge erforderlich
- PTFE-Isolation
- für Innenraummontage

- outer conductor system without contact ring, in copper / copper alloy
- quick and simple assembly
- no special tools required
- PTFE insulation
- for indoor application

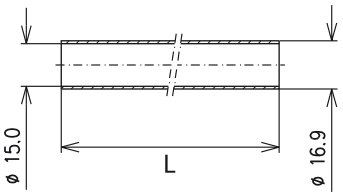
		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	0.90 kg 1.80 kg	**BN A0 24 06** **BN K1 96 40**
Außenleiterrohr (Kupfer) Outer conductor tube (copper)	L = 2 m L = 4 m	2.80 kg 5.60 kg	**BN A0 24 07** **BN K1 96 08**
Mittelstütze Inner support		0.04 kg	**BN 85 99 06**
Übergang SMS-2 Schelle auf 1 5/8" EIA Adaptor SMS-2 clamp to 1 5/8" EIA		0.21 kg	**BN B1 34 87 C1000**
Kupplungselement für 1 5/8" EIA inkl. Schraubensatz Coupling element for 1 5/8" EIA incl. screw set		0.16 kg	**BN 91 83 11**
Rohrleitungsverbinder Rigid line splice		0.46 kg	**BN 54 27 49**
90° Winkel 90° Elbow		0.66 kg	**BN 54 27 42**

Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		3.2 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		7.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 2.7 GHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	0.63 0.95 1.83

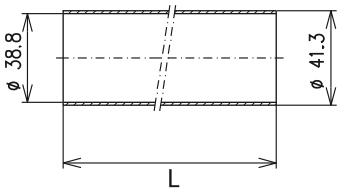
Montageanleitung Installation instruction	M 36129

Data subject to change without notice – Edition E

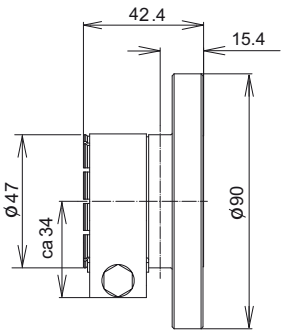
ROHRLEITUNGSKOMPONENTEN 1 5/8" SMS-2
RIGID LINE COMPONENTS 1 5/8" SMS-2



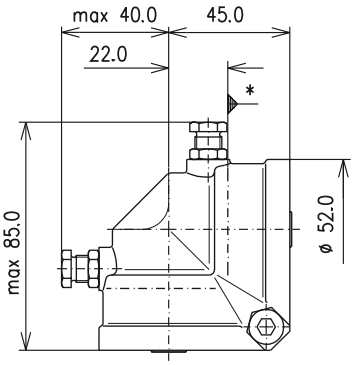
Innenleiterrohr
Inner conductor tube
BN A0 24 06; BN K1 96 40



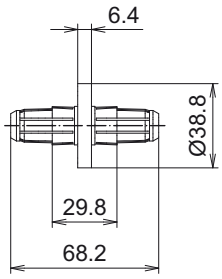
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 07; BN K1 96 08



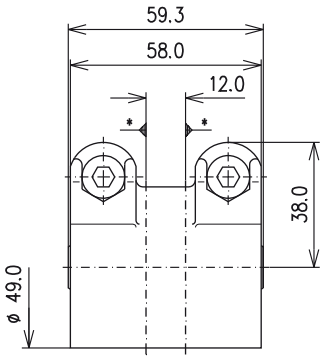
Übergang SMS-2 Schelle auf 1 5/8" EIA
Adaptor SMS-2 clamp to 1 5/8" EIA
BN B1 34 87 C1000



90° Winkel mit Abgleichschrauben
90° Elbow with adjustment screws
BN 54 27 42



Mittelstütze
Inner support
BN 85 99 06



Rohrleitungsverbinder
Rigid line splice
BN 54 27 49

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
1.4 m ≤ L ≤ 2.8 m	1
2.8 m < L ≤ 4.0 m	2

* Bezugsebene
Reference plane

ROHRLEITUNGSKOMPONENTEN 3 1/8" SMS
RIGID LINE COMPONENTS 3 1/8" SMS

- Außenleitersystem Aluminium / Aluminiumlegierung
- einfache und schnelle Montage
- keine Spezialwerkzeuge erforderlich
- PTFE-Isolation
- für Innenraummontage

- outer conductor system aluminium / aluminium alloy
- quick and simple assembly
- no special tools required
- PTFE insulation
- for indoor application

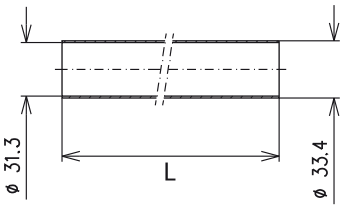
		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	1.90 kg 3.80 kg	**BN A0 24 15** **BN K2 27 70**
Außenleiterrohr (Aluminium) Outer conductor tube (aluminium)	L = 2 m L = 4 m	1.70 kg 3.40 kg	**BN A0 24 17** **BN K2 02 02**
Mittelstütze Inner support		0.27 kg	**BN 87 00 03**
Übergang SMS Schelle auf 3 1/8" EIA Adaptor SMS clamp to 3 1/8" EIA		0.40 kg	**BN B1 08 65 C1000**
Kupplungelement für 3 1/8" EIA inkl. Schraubensatz Coupling element for 3 1/8" EIA incl. screw set		0.58 kg	**BN 91 87 10**
Rohrleitungsverbinder Rigid line splice		0.64 kg	**BN 53 27 21**
90° Winkel 90° Elbow		1.32 kg	**BN 53 27 23**

Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		1.6 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		14.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 1.3 GHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 63.0 kW ≤ 42.0 kW ≤ 22.0 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	0.37 0.56 1.08

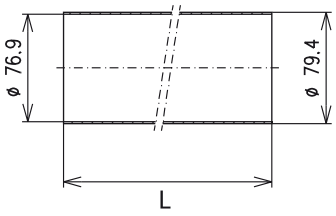
Montageanleitung Installation instruction	M 36125

Data subject to change without notice – Edition E

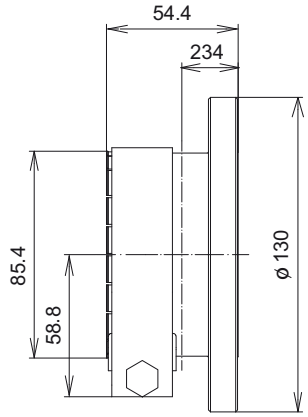
ROHRLEITUNGSKOMPONENTEN 3 1/8" SMS
RIGID LINE COMPONENTS 3 1/8" SMS



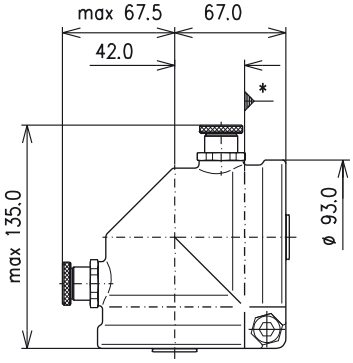
Innenleiterroher
Inner conductor tube
BN A0 24 15; BN K2 27 70



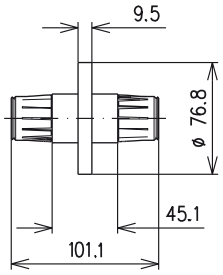
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 17; BN K2 02 02



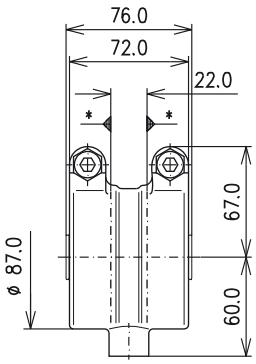
Übergang SMS Schelle auf 3 1/8" EIA
Adaptor SMS clamp to 3 1/8" EIA
BN B1 08 65 C1000



90° Winkel mit Abgleichschrauben
90° Elbow with adjustment screws
BN 53 27 23



Mittelstütze
Inner support
BN 87 00 03



Rohrleitungsverbinder
Rigid line splice
BN 53 27 21

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
2.0 m ≤ L ≤ 4.0 m	1

* Bezugsebene
Reference plane

ROHRLEITUNGSKOMPONENTEN 4 1/2" SMS
RIGID LINE COMPONENTS 4 1/2" SMS

- Außenleitersystem Aluminium / Aluminiumlegierung
- einfache und schnelle Montage
- keine Spezialwerkzeuge erforderlich
- PTFE-Isolation
- für Innenraummontage

- outer conductor system aluminium / aluminium alloy
- quick and simple assembly
- no special tools required
- PTFE insulation
- for indoor application

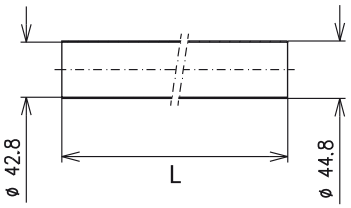
		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	2.50 kg 5.00 kg	**BN A0 24 21** **BN K2 62 91**
Außenleiterrohr (Aluminium) Outer conductor tube (aluminium)	L = 2 m L = 4 m	2.70 kg 5.40 kg	**BN A0 24 23** **BN K2 02 03**
Mittelstütze Inner support		0.60 kg	**BN 64 86 02**
Übergang SMS Schelle auf 4 1/2" EIA (339 IEC 50-105) Adaptor SMS clamp to 4 1/2" EIA (339 IEC 50-105)		0.93 kg	**BN 53 27 66**
Kupplungselement für 4 1/2" EIA inkl. Schraubensatz (339 IEC 50-105) Coupling element for 4 1/2" EIA incl. screw set (339 IEC 50-105)		1.07 kg	**BN 82 28 10**
Rohrleitungsverbinder Rigid line splice		2.02 kg	**BN 53 27 63**
90° Winkel 90° Elbow		3.72 kg	**BN 53 27 61**

Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		1.2 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		19.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 1.0 GHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 106.0 kW ≤ 70.0 kW ≤ 37.0 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	0.28 0.42 0.82

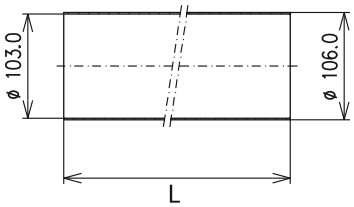
Montageanleitung Installation instruction	M 36126

Data subject to change without notice – Edition E

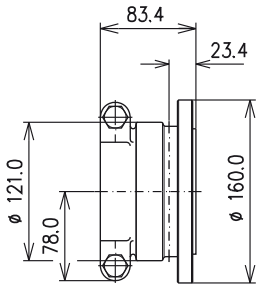
ROHRLEITUNGSKOMPONENTEN 4 1/2" SMS
RIGID LINE COMPONENTS 4 1/2" SMS



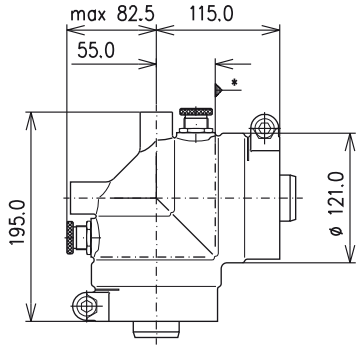
Innenleiterrohr
Inner conductor tube
BN A0 24 21; BN K2 62 91



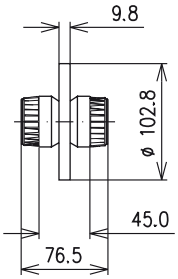
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 23; BN K2 02 03



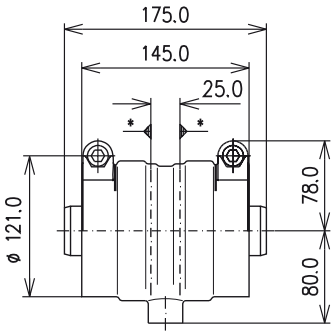
Übergang SMS Schelle auf 4 1/2" EIA [1)]
Adaptor SMS clamp to 4 1/2" EIA [1)]
BN 53 27 66



90° Winkel mit Abgleichschrauben
90° Elbow with adjustment screws
BN 53 27 61



Mittelstütze
Inner support
BN 64 86 02



Rohrleitungsverbinder
Rigid line splice
BN 53 27 63

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
2.5 m ≤ L ≤ 4.0 m	1

[1)] 339 IEC 50-105
* Bezugsebene
Reference plane

ROHRLEITUNGSKOMPONENTEN 52-120 SMS

RIGID LINE COMPONENTS 52-120 SMS

- Außenleitersystem Aluminium / Aluminiumlegierung
- einfache und schnelle Montage
- keine Spezialwerkzeuge erforderlich
- PTFE-Isolation
- für Innenraummontage

- outer conductor system aluminium / aluminium alloy
- quick and simple assembly
- no special tools required
- PTFE insulation
- for indoor application

		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	2.90 kg 5.80 kg	**BN A0 24 24** **BN K2 40 58**
Außenleiterrohr (Aluminium) Outer conductor tube (aluminium)	L = 2 m L = 4 m	3.20 kg 6.40 kg	**BN A0 24 26** **BN K2 02 06**
Mittelstütze Inner support		1.78 kg	**BN 54 27 05**
Übergang SMS Schelle auf 4 1/2" EIA (339 IEC 50-105) Adaptor SMS clamp to 4 1/2" EIA (339 IEC 50-105)		6.94 kg	**BN 54 27 20**
Kupplungselement für 4 1/2" EIA inkl. Schraubenset (339 IEC 50-105) Coupling element for 4 1/2" EIA incl. screw set (339 IEC 50-105)		1.07 kg	**BN 82 28 10**
Übergang SMS Schelle auf 6 1/8" EIA Adaptor SMS clamp to 6 1/8" EIA		9.50 kg	**BN 54 27 01**
Kupplungselement für 6 1/8" EIA inkl. Schraubenset Coupling element for 6 1/8" EIA incl. screw set		2.12 kg	**BN 91 93 10**
Übergang SMS Schelle auf 52-120 BT Adaptor SMS clamp to 52-120 BT		0.90 kg	**BN 54 27 26**
Kupplungselement 52-120 BT inkl. Schraubenset Coupling element 52-120 BT incl. screw set		1.31 kg	**BN 52 81 01**
Rohrleitungsverbinder Rigid line splice		3.34 kg	**BN 54 27 04**
90° Winkel 90° Elbow		5.22 kg	**BN 54 27 02**

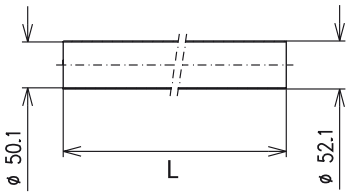
Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		1.0 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		22.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 890 MHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 140.0 kW ≤ 92.0 kW ≤ 47.0 kW (≤ 57.0 kW) [1]
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	0.24 0.36 0.69

Montageanleitung Installation instruction	M 36127

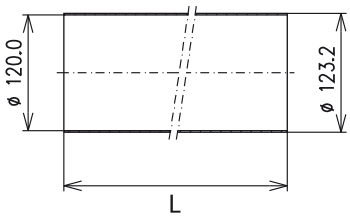
[1] Hierfür muss die Rohrleitung mit einem schwarzen, hitzebeständigen Lack versehen werden
In this case it is necessary to paint the rigid line with a black, heat resistant varnish

Data subject to change without notice – Edition E

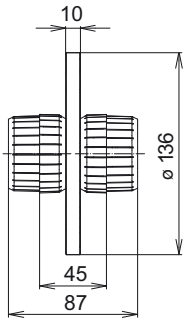
ROHRLEITUNGSKOMPONENTEN 52-120 SMS
RIGID LINE COMPONENTS 52-120 SMS



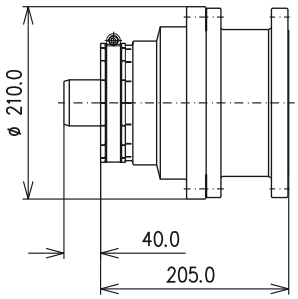
Innenleiterrohr
Inner conductor tube
BN A0 24 24; BN K2 40 58



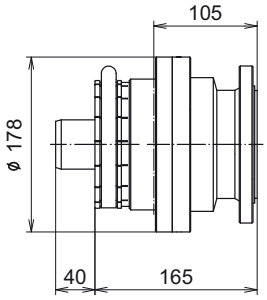
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 26; BN K2 02 06



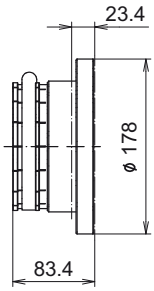
Kupplungselement 52-120 BT inkl. Schraubenset
Coupling element 52-120 BT incl. screw set
BN 52 81 01



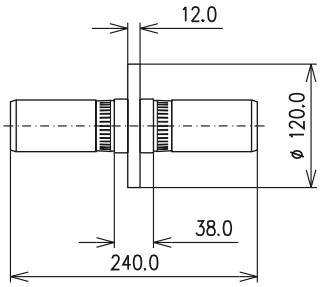
Übergang SMS Schelle auf 6 1/8" EIA
Adaptor SMS clamp to 6 1/8" EIA
BN 54 27 01



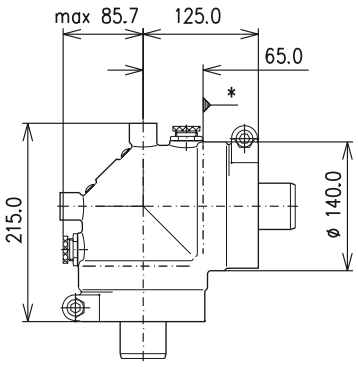
Übergang SMS Schelle auf 4 1/2" EIA[1)]
Adaptor SMS clamp to 4 1/2" EIA[1)]
BN 54 27 20



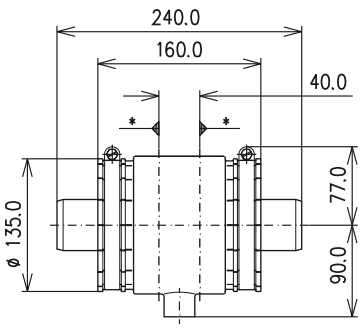
Übergang SMS Schelle auf 52-120 BT
Adaptor SMS clamp to 52-120 BT
BN 54 27 26



Mittelstütze
Inner support
BN 54 27 05



90° Winkel mit Abgleichschrauben
90° Elbow with adjustment screws
BN 54 27 02



Rohrleitungsverbinder
Rigid line splice
BN 54 27 04

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
3.0 m ≤ L ≤ 4.0 m	1

[1)] 339 IEC 50-105

* Bezugsebene
Reference plane

ROHRLEITUNGSKOMPONENTEN 52-120 BT

RIGID LINE COMPONENTS 52-120 BT

- Außenleitersystem Kupfer / Kupferlegierung
- einfache Montage
- hierzu SPINNER Bördelgerät BN 51 14 00 mit Einsatz BN 51 14 45
- PTFE-Isolation
- für Innenraummontage

- outer conductor system copper / copper alloy
- easy assembly
- SPINNER flaring tool BN 51 14 00 with Insert BN 51 14 45 available
- PTFE insulation
- for indoor application

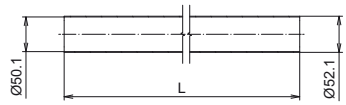
		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	2.90 kg 5.80 kg	**BN A0 24 24** **BN K2 40 58**
Außenleiterrohr (Kupfer) Outer conductor tube (copper)	L = 2 m L = 4 m	10.21 kg 20.42 kg	**BN A0 24 25** **BN K3 32 21**
Mittelstütze Inner support		1.78 kg	**BN 54 27 05**
Flansch Flange		1.72 kg	**BN 04 99 17 S012**
Kupplungselement 52-120 BT inkl. Schraubensatz Coupling element 52-120 BT including screw set		1.31 kg	**BN 52 81 01**
90° Winkel 90° Elbow		8.52 kg	**BN 52 81 65**
Übergang 52-120 BT (ohne Kupplungselement) auf 4 1/2" EIA (339 IEC 50-105) Adaptor 52-120 BT (without coupling element) to 4 1/2" EIA (339 IEC 50-105)		4.06 kg	**BN 52 81 18**
Kupplungselement für 4 1/2" EIA inkl. Schraubenset (339 IEC 50-105) Coupling element for 4 1/2" incl. screw set (339 IEC 50-105)		1.07 kg	**BN 82 28 10**
Übergang 52-120 BT (ohne Kupplungselement) auf 6 1/8" EIA Adaptor 52-120 BT (without coupling element) to 6 1/8" EIA		5.30 kg	**BN 52 81 17**
Kupplungselement für 6 1/8" EIA inkl. Schraubenset Coupling element for 6 1/8" EIA incl. screw set		2.12 kg	**BN 91 93 10**

Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		1.0 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		22.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 860 MHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 860 MHz	≤ 142.0 kW ≤ 93.0 kW ≤ 48.0 kW (≤ 60.0 kW) [1]
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 860 MHz	0.22 0.33 0.63

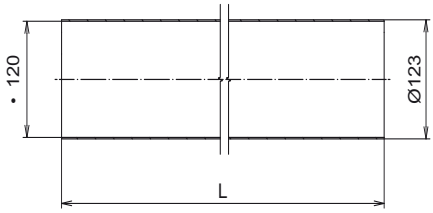
[1] Hierfür muss die Rohrleitung mit einem schwarzen, hitzebeständigen Lack versehen werden
In this case it is necessary to paint the rigid line with a black, heat resistant varnish

Data subject to change without notice – Edition E

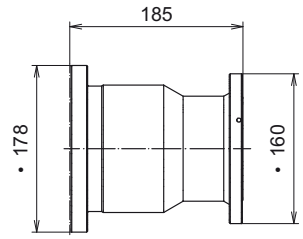
ROHRLEITUNGSKOMPONENTEN 52-120 BT
RIGID LINE COMPONENTS 52-120 BT



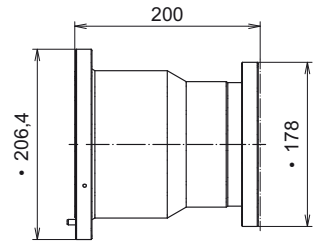
Innenleiterrohr
Inner conductor tube
BN A0 24 24; BN K2 40 58



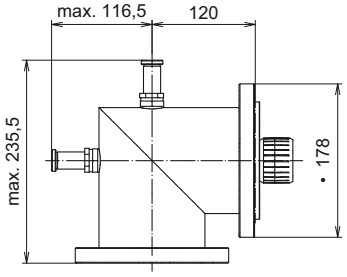
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 25; BN K3 32 21



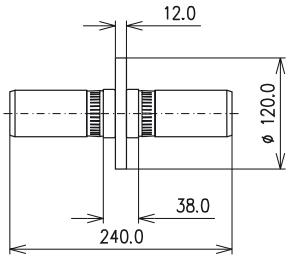
Übergang 52-120 BT auf 4 1/2" EIA [1)]
Adaptor 52-120 BT to 4 1/2" EIA [1)]
BN 52 81 18



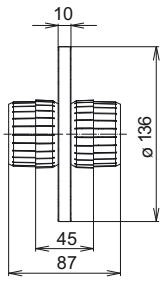
Übergang 52-120 BT auf 6 1/8" EIA
Adaptor 52-120 BT to 6 1/8" EIA
BN 52 81 17



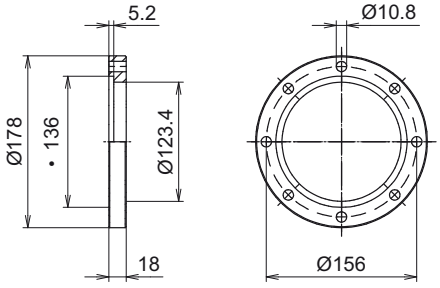
90° Winkel mit Abgleichschrauben
90° Elbow with adjustment screws
BN 52 81 65



Mittelstütze
Inner support
BN 54 27 05



Kupplungselement, inkl. Schraubensatz
Coupling element, including screw set
BN 52 81 01



Flansch, vernickelt
Flange, Nickel plated
BN 04 99 17 S012

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
3.0 m ≤ L ≤ 4.0 m	1

[1)] 339 IEC 50-105

ROHRLEITUNGSKOMPONENTEN 6 1/8" SMS
RIGID LINE COMPONENTS 6 1/8" SMS

- Außenleitersystem Aluminium / Aluminiumlegierung
- einfache und schnelle Montage
- keine Spezialwerkzeuge erforderlich
- PTFE-Isolation
- für Innenraummontage

- outer conductor system aluminium / aluminium alloy
- quick and simple assembly
- no special tools required
- PTFE insulation
- for indoor application

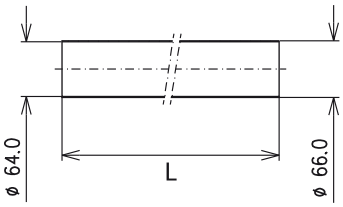
		Gewicht Weight	Bestellnummer Part number
Innenleiterrohr (Kupfer) Inner conductor tube (copper)	L = 2 m L = 4 m	3.50 kg 7.00 kg	**BN A0 24 27** **BN K2 33 34**
Außenleiterrohr (Aluminium) Outer conductor tube (aluminium)	L = 2 m L = 4 m	5.50 kg 11.00 kg	**BN A0 24 29** **BN K2 02 04**
Mittelstütze Inner support		2.45 kg	**BN 53 27 84**
Übergang SMS Schelle auf 6 1/8" EIA Adaptor SMS clamp to 6 1/8" EIA		1.28 kg	**BN 53 27 89**
Kupplungselement für 6 1/8" EIA inkl. Schraubenset Coupling element for 6 1/8" EIA incl. screw set		2.12 kg	**BN 91 93 10**
Rohrleitungsverbinder Rigid line splice		3.44 kg	**BN 53 27 83**
90° Winkel 90° Elbow		3.70 kg	**BN 53 27 81**

Wellenwiderstand Impedance		50 Ω
Grenzfrequenz für H11-Mode Cut off frequency for H11-Mode		0.83 GHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		28.0 kV
Frequenzbereich Frequency range		0 ≤ f ≤ 800 MHz
Effektive Leistung bei +40 °C Umgebungstemperatur Average power at +40 °C ambient temperature	100 MHz 230 MHz 800 MHz	≤ 213.0 kW ≤ 140.0 kW ≤ 72.0 kW
Dämpfung bei +20 °C Umgebungstemperatur (dB/100m) Attenuation at +20 °C ambient temperature (dB/100m)	100 MHz 230 MHz 800 MHz	0.19 0.28 0.54

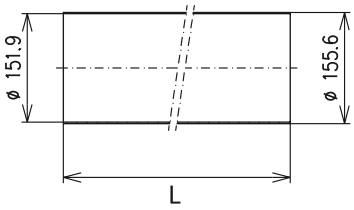
Montageanleitung Installation instruction	M 36128

Data subject to change without notice – Edition E

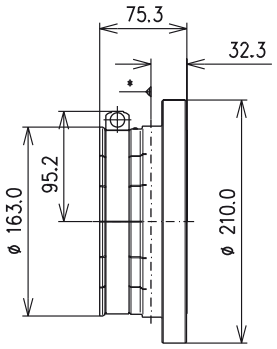
ROHRLEITUNGSKOMPONENTEN 6 1/8" SMS
RIGID LINE COMPONENTS 6 1/8" SMS



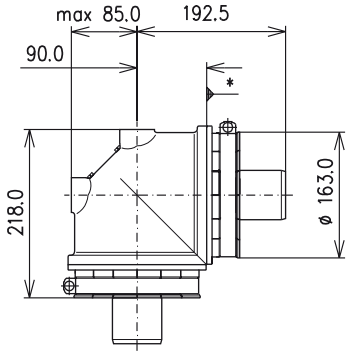
Innenleiterrohr
Inner conductor tube
BN A0 24 27; BN K2 33 34



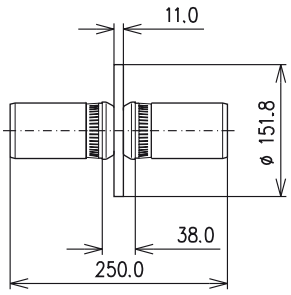
Außenleiterrohr (unlackiert)
Outer conductor tube (not painted)
BN A0 24 29; BN K2 02 04



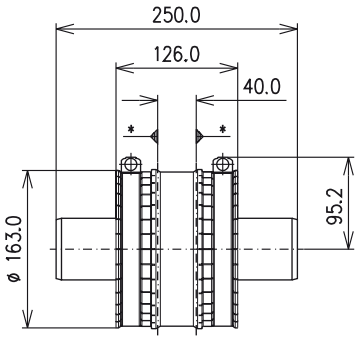
Übergang SMS Schelle auf 6 1/8" EIA
Adaptor SMS clamp to 6 1/8" EIA
BN 53 27 89



90° Winkel mit Abgleichschraube
90° Elbow with adjustment screw
BN 53 27 81



Mittelstütze
Inner support
BN 53 27 84



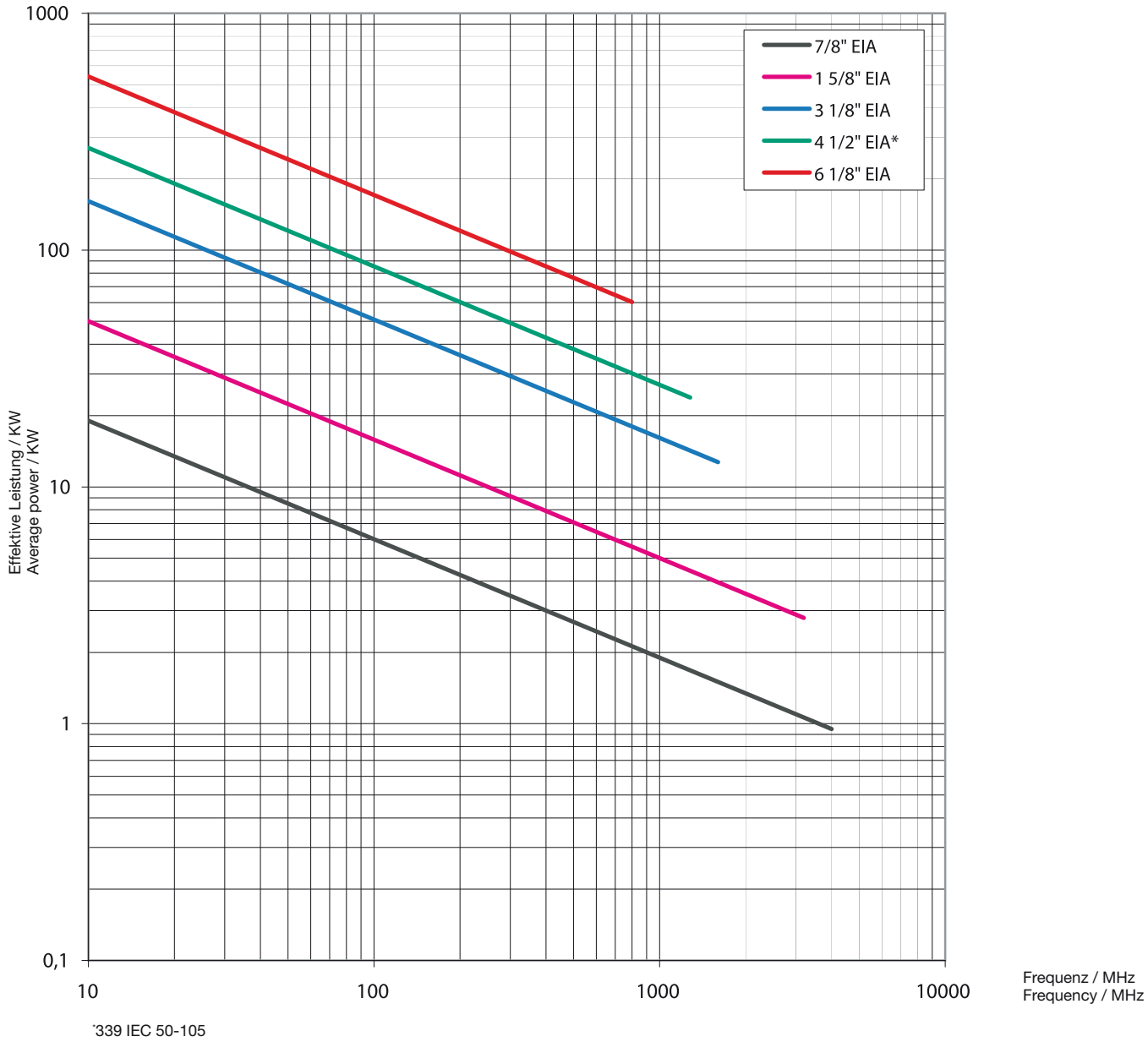
Rohrleitungsverbinder
Rigid line splice
BN 53 27 83

Rohrleitungslänge L Length of rigid line L	Benötigte Anzahl der Mittelstützen Number inner supports required
3.0 m ≤ L ≤ 4.0 m	1

* Bezugsebene
Reference plane

KABELSTECKVERBINDER
CABLE CONNECTORS

Maximale Anschlussleistung
Maximum Power rating



*339 IEC 50-105

Alle Leistungsangaben beziehen sich auf das angegebene Stecksystem bei +40 °C Umgebungstemperatur und einer Innenleitertemperatur von +120 °C.

Achtung:
Die Höhe der übertragbaren Leistung kann durch das am Steckverbinder montierte Kabel reduziert werden.

All power ratings apply to the according connector system at +40 °C ambient temperature with an inner conductor temperature of +120 °C.

Note:
The power rating may be reduced by the cable attached to the connector.

Data subject to change without notice – Edition E

KABELSTECKVERBINDER
CABLE CONNECTORS

- genormt nach EIA STD RS-225, IEC 60339, MiL-F 24044 bzw. nach IEC 60169-4/-5
- schnelle und einfache Montage
- Abdichtung der Kabelabfangung: Plast 2000®
- Cut And Fit (CAF®) oder Premium Version
- Steckverbinder für HCA-Kabel längs- und querdicht

- EIA STD RS-225, IEC 60339, MiL-F 24044 certified resp. IEC 60169-4/-5
- quick and easy assembly
- cable clamp sealing: Plast 2000®
- Cut And Fit (CAF®) or Premium type design
- Barrier and mating face sealed connectors for HCA cables

Kabelsteckverbinder für CELLFLEX-Kabel
Cable Connectors for CELLFLEX Cables

Kabeltyp Cable type	Steckverbindergröße Connector size		Ausführ. Type
	7/8" EIA	1 5/8" EIA	
SCF/UCF 12-50[1]	**BN 71 55 80**	–	CAF®
LCF12-50	**BN 71 55 68**	–	CAF®
UCF/LCF 78-50 A	**BN 71 55 58**	**BN 72 34 58**	CAF®
UCF/LCFS 114-50 A	**BN 71 55 87**	**BN 72 34 84**	CAF®
LCF 158-50 A	**BN 71 55 88**	**BN 72 34 86**	CAF®
LCF 214-50 A	–	**BN 72 34 73**	CAF®

[1] Abdichtung der Kabelabfangung mit Profildichtung
Cable clamp sealed with profile gasket

Steckverbinder 7-16 und N für Kabel mit Kupferwellrohr-Außenleiter und Schaum-Dielektrikum (LF- bzw. SF) finden Sie in unserem PRODUCTFINDER auf unserer Webseite www.SPINNER-group.com.
Cable Connectors 7-16 and N for cables with copper corrugated outer conductor and foam dielectric (LF/SF) you will find on our website www.SPINNER-group.com PRODUCTFINDER.

Kabelsteckverbinder für HELIFLEX-Kabel
Cable Connectors for HELIFLEX Cables

Kabeltyp Cable type	Steckverbindergröße Connector size							Ausführung Type
	7-16 m	13-30 m	7/8" EIA	1 5/8" EIA	3 1/8" EIA	4 1/2" EIA 339 IEC 50-105	6 1/8" EIA	
HCA 38-50	**BN 97 06 28**	–	**BN 97 13 05**[1]	–	–	–	–	CAF®
HCA 58-50	**BN 92 55 25**	–	**BN 97 87 18**	–	–	–	–	CAF®
HCA 78-50	**BN 49 18 18**	**BN 39 87 18**	**BN 97 91 28**	**BN 97 89 18**	–	–	–	CAF®
HCA 118-50	–	**BN 71 19 08**	–	**BN 85 82 10**	–	–	–	Premium
HCA 158-50	–	–	**BN 83 91 10**	**BN 93 65 10**	–	–	–	Premium
HCA 295-50	–	–	–	–	**BN 93 00 50**	–	–	Premium
HCA 400-50 (HCA 318-50)	–	–	–	–	**BN 93 00 10**	–	–	Premium
HCA 495-50 (HCA 418-50)	–	–	–	–	–	**BN 83 86 03**	–	Premium
HCA 550-50 (HCA 500-50)	–	–	–	–	–	**BN 65 82 03**	**BN 65 67 02**	Premium
HCA 618-50	–	–	–	–	–	–	**BN 87 11 09**	Premium

[1] Stecker-Innenleiter mit Kabel-Innenleiter verschraubt
Contact attachment: inner conductor threated

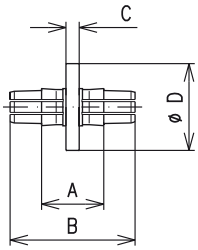
KUPPLUNGSELEMENTE
COUPLING ELEMENTS

Kupplungselemente werden komplett wie folgt geliefert:

- Innenleiter mit PTFE-Isolierstütze
- Schrauben mit Muttern und Zubehör aus nicht rostendem Stahl
- O-Ring aus EPDM bzw. Silikonkautschuk

Coupling elements will be delivered as follows:

- inner conductor with PTFE-insulator
- screws with nuts and accessories made of stainless steel
- O-ring made of EPDM or silicone rubber



Bestellnummer Part number		**BN 91 17 15**	**BN 91 83 11**	**BN 91 87 10**	**BN 82 28 10**	**BN 91 93 10**
Steckverbindergröße Connector size		7/8" EIA	1 5/8" EIA	3 1/8" EIA	4 1/2" EIA 339 IEC 50-105	6 1/8" EIA
Abmessungen Dimensions (mm)	A	23.8	29.80	45.1	45.0	63.0
	B	49.1	59.80	101.1	76.5	108.0
	C	4.7	6.35	9.5	9.8	11.0
	D	20.6	41.50	81.3 [1)]	104.75	153.7

[1)] Abweichend von 339 IEC 50-80 (etwas vergrößerter Durchmesser gewährleistet optimale Zentrierung des Innenleiters)
Difference to 339 IEC 50-80 (slightly increased diameter effects optimal centering of the inner conductor)

Data subject to change without notice – Edition E

PLAST 2000

PLAST 2000

- garantiert eine absolut einwandfreie Abdichtung zwischen Steckverbinder und Kabel
- optimaler Korrosionsschutz der Außenleiterkontaktstelle zwischen Kabel und Steckverbinder
- die 20 cm³ Tube kann direkt in die Kabelabfangung eingeschraubt werden
- bei Verwendung der 70 cm³ Tube ist die Einspritzpresse BN 07 05 51 erforderlich

- ensures absolutely flawless seal between connector and cable
- optimum corrosion protection of the outer conductor contact between cable and connector
- the 20 cm³ tube can be screwed directly into the cable clamp
- when using the 70 cm³ tube the injection gun BN 07 05 51 is required

Bauteil Part	Bestellnummer Part number
20 cm³ Tube	**BN 15 16 71**
70 cm³ Tube	**BN 15 05 97**
Einspritzpresse mit Gewinde M9 Injection gun with thread M9	**BN 07 05 51**

Siehe auch Sicherheits-Datenblatt gemäß ISO/DIS 11014
See also Material Safety Data Sheet acc. ISO/DIS 11014

Kabeltyp Cable type	Füllmenge Filling quantity
LCF 12-50	4 cm³
LCF 58-50	6 cm³
LCF 78-50	7 cm³
UCF / LCFS 114-50	15 cm³
LCF 158-50	20 cm³
LCF 214-50	28 cm³
HCA 58-50	5 cm³
HCA 78-50	5 cm³
HCA 118-50	10 cm³
HCA 158-50	20 cm³
HCA 295-50	50 cm³
HCA 400-50 (HCA 318-50)	70 cm³
HCA 495-50 (HCA 418-50)	120 cm³
HCA 550-50 (HCA 500-50)	250 cm³
HCA 618-50	300 cm³

BÖRDELGERÄTE UND EINSÄTZE
FLARING TOOLS AND INSERTS

- für luftraumisolierte Kupfer-Wellrohrkabel und Rohrleitung 52-120 BT
- gewährleistet bestmöglichen HF-Kontakt
- Basisgerät verwendbar für mehrere Kabeltypen durch zusätzliche Einsätze
- Standard Bördelgerät mit Einsatz für die Rohrleitung 52-120 BT

- for air dielectric copper corrugated cables and rigid line 52-120 BT
- assures optimal RF contact
- basic tool usable for different cables with additional inserts
- standard flaring tool with insert for the rigid line 52-120 BT

Kabeltyp **Cable type**	**Bördelgerät / Flaring Tool** **Bestellnummer / Part number**	**Einsatz / Insert** **Bestellnummer / Part number**
HCA 118-50	**BN 51 14 11**	**BN 51 14 47**
HCA 158-50	**BN 51 14 11**	**BN 51 14 57**
HCA 295-50	**BN 51 14 11**	**BN 51 14 81**
HCA 400-50 (HCA 318-50)	**BN 51 14 11** **BN 51 14 00**	Not necessary **BN 51 14 42**
HCA 495-50 (HCA 418-50)	**BN 51 14 00**	**BN 51 14 43**
HCA 550-50 (HCA 500-50)	**BN 51 14 00**	**BN 51 14 44**
HCA 618-50	**BN 51 14 00**	Not necessary
Rohrleitung/Rigid line 52-120 BT	**BN 51 14 00**	**BN 51 14 45**

ABSETZWERKZEUGE
TRIMMING TOOLS

- für Kupfer-Wellrohrkabel
- Reduzierung der Montagezeiten um über 60 %
- erhebliche Senkung der Montagekosten
- gleichbleibende Montagequalität

- for copper corrugated cables
- assembly time cut by more than 60 %
- considerable reduction of the assembly costs
- constant assembly quality

Kabeltyp **Cable type**	**Bestellnummer** **Part number**
SCF / UCF 12-50	**BN 54 13 34**
LCF 12-50	**BN 54 13 17**
LCF 78-50 A	**BN 54 13 18**
UCF / LCFS 114-50 A LCF 158-50 A	**BN 54 13 46** [1]
UCF 114-50 A LCF 158-50 A LCF 214-50 A	**BN 54 13 43** [2]
HCA 58-50	**BN 54 13 41**
HCA 78-50	**BN 54 13 42**

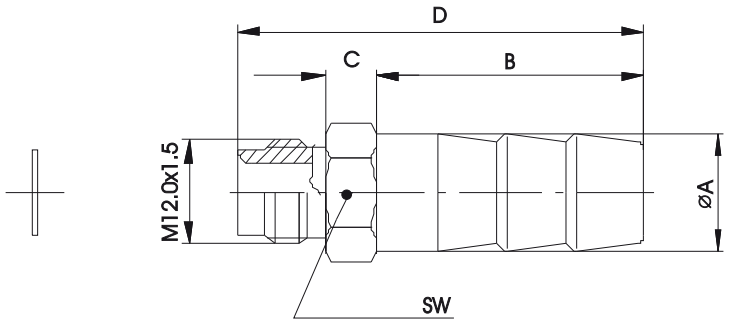
[1] Schwere Ausführung mit Kurbel
Heavy duty type with crank
[2] Einfache Ausführung mit Kurbel
Economy type with crank

Data subject to change without notice – Edition E

GASANSCHLÜSSE
GAS INLETS

- geeignet für alle Steckverbinder der Premium-Ausführung für HELIFLEX-Kabel
- zur Belüftung von Kabeln, um das Eindringen oder die Bildung von Feuchtigkeit zu vermeiden

- suitable for all connectors in premium version for HELIFLEX-cables
- used to pressurise the cable to avoid penetration or build up of moisture



Gasanschlüsse für HELIFLEX-Kabel
Gas inlets for HELIFLEX cables

Kabeltyp Cable type	Gewinde Thread	Schlauchinnen-durchmesser Inner hose diameter	Dimension A	Dimension B	Dimension C	Dimension D	SW	Bestellnummer Part number
HCA 118-50 HCA 158-50 HCA 295-50 HCA 400-50 (HCA 318-50) HCA 495-50 (HCA 418-50) HCA 550-50 (HCA 500-50) HCA 618-50	M12 x 1.5	6 mm 10 mm 13 mm	Ø 7.0 mm Ø 11.0 mm Ø 13.5 mm	24.5 mm 31.0 mm 31.0 mm	6.0 mm 6.0 mm 6.0 mm	40.5 mm 47.0 mm 47.0 mm	12.0 mm 12.0 mm 14.0 mm	**BN 00 47 71** **BN 00 47 70** **BN 00 47 81**

Alle Steckverbinder für die Kabelgrößen HCA 118-50 bis HCA 618-50 besitzen einen Adapter von Gewinde M12 x 1.5 auf Gewinde G 1/8" zur Verwendung eines handelsüblichen Gasanschlusses mit Außengewinde G 1/8".

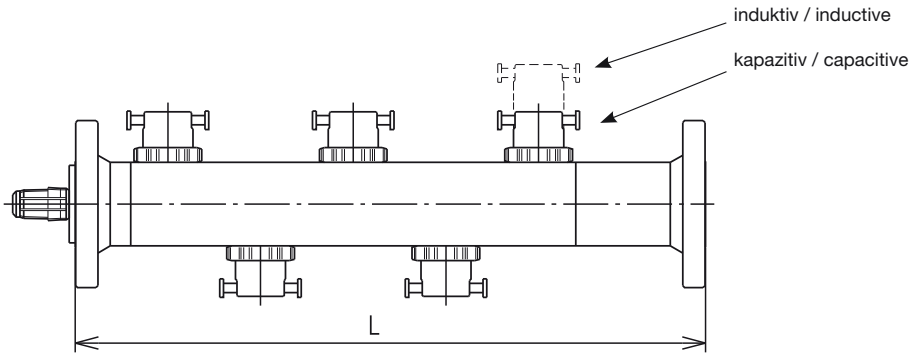
All connectors for the cable sizes HCA 118-50 to HCA 618-50 include an adaptor for the screw thread M12 x 1.5 to G 1/8", enabling the use of a common gas inlet which has an outer thread of G 1/8".

SW = Schlüsselweite / Wrench size

TRIMMLEITUNGEN
TRIMMING LINES

- zur Verbesserung des VSWR
- mit 5 Trimmschrauben
- für Innenraummontage

- used to improve the VSWR
- with 5 trimming screws
- for indoor application



Bestellnummer Part number	**BN B0 04 73**	**BN 52 56 23**	**BN 52 92 50**	**BN B1 05 78**	**BN 53 85 40**	**BN 53 85 29**
Frequenzbereich Frequency range	470 - 860 MHz	470 - 860 MHz	470 - 860 MHz	470 - 860 MHz	470 - 860 MHz	470 - 800 MHz
Prüfspannung Proof voltage	≤ 2.0 kV	≤ 2.7 kV	≤ 5.0 kV	≤ 12.0 kV	≤ 15.0 kV	≤ 25.0 kV
Effektive Leistung (860 MHz) bei +40 °C Umgebungstemperatur Average power (860 MHz) at +40 °C ambienet temperature	≤ 2.0 kW	≤ 2.6 kW	≤ 7.0 kW	≤ 23.0 kW	≤ 38.0 kW	≤ 78.0 kW (800 MHz)
Anschluss 1 Connector 1	7-16 Kuppler 7-16 female	7/8" EIA [1]	1 5/8" EIA [1]	3 1/8" EIA [1]	4 1/2" EIA [1] 339 IEC 50-105	6 1/8" EIA [1]
Anzahl Trimmschrauben Number of trimming screws	5	5	5	5	5	5
Länge Length	195 mm	auf Anfrage on request	340 mm	400 mm	450 mm	450 mm
Gewicht Weight	1.38 kg	auf Anfrage on request	2.90 kg	5.10 kg	10.80 kg	14.10 kg

[1] Eine Seite mit fest eingebautem Kupplungselement
One side with solid built-in coupling element

Die Prüfspannung bezieht sich auf 860 MHz (800 MHz) und maximaler kapazitiver Belastung (Trimmschrauben ganz eingeschraubt). Trimmleitungen können in Serie geschaltet werden, um den Einstellbereich für niedrigere Frequenzen zu erhöhen.

The proof voltage value refers to 860 MHz (800 MHz) and maximal capacitive loading (trimming screws entirely screwed in). Trimming lines can be connected in series to increase the tuning range for lower frequencies.

Data subject to change without notice – Edition E

ÜBERGANGSVERBINDER & MESSZUBEHÖR
ADAPTORS & MEASUREMENT ACCESSORIES

SPINNER führt ein umfangreiches Programm an Zubehör zur Erleichterung von Mess- und Wartungsarbeiten.
Beispielsweise liefern wir Übergangsverbinder auf die gängigsten internationalen Stecksysteme und Richtkoppler zur Messung der Vor- und Rücklaufleistung.
Messtrennstücke ermöglichen einen Antennentest bzw. Antennenabgleich ohne Zerlegen der Anschlussleitung.

SPINNER ist zudem ein weltweit renommierter Lieferant hochpräziser Komponenten für Messungen und Kalibrierungen bis 67 GHz, die ausführlich in unserem Katalog für Mess- & Kalibrierkomponenten beschrieben werden. Natürlich werden typische terrestrische Rundfunk-Anwendungen in weitaus niedrigeren Frequenzen betrieben, daher haben wir eine Auswahl an Komponenten zusammengestellt, die für Messungen im Rundfunkbereich benötigt werden, beispielsweise Kalibrierkits, Präzisionsadapter und Kabel etc.

SPINNER offers a comprehensive range of accessories to facilitate measuring and maintenance work.
We deliver, for example, adapters for almost all common international connector systems, directional couplers for measuring the forward and reflected power and direct access units that allow antenna tests or adjustments without disassembling the connected lines.

SPINNER is also a world class supplier of high precision components for measurement and calibration up to 67 GHz, which are covered in detail in our Measurement & Calibration Equipment Catalogue. Of course typical terrestrial broadcasting application operate at far lower frequencies, therefore we have put together an excerpt of components that come in handy for the most common measurements required with broadcasting equipment, such as calibration kits, precision adapters and cables etc.

Adaptors for high power and measurement
- Standard adaptors
- Short adaptors

Direct access units

Monitoring couplers
- Standard double monitoring couplers
- Standard multi monitoring couplers
- Frequency response compensated multi monitoring couplers

Measurement accessories
- Calibration kits
- Precision adaptors
- Measurement cables
- Precision loads
- Attenuators

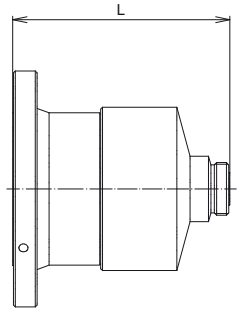
ÜBERGANGSVERBINDER
ADAPTORS

- hervorragende elektrische Eigenschaften (Bsp. VSWR ≤ 1,02 / Rückflussdämpfung ≥ 40 dB bis 1 GHz - Ausnahme: 6 1/8" Adapter bis 800 MHz)
- für Außenmontage
- Übergangsverbinder auch in Kurzbauweise

- excellent electrical performance (e.g. VSWR ≤ 1.02 / return loss ≥ 40 dB up to 1 GHz - exeption: 6 1/8" adaptor up to 800 MHz)
- for outdoor application
- also short length adaptors available

Übergänge
Adaptors

Anschluss 1 Connector 1		Anschluss 2 Connector 2		Länge L Length L	Gewicht Weight	Bestellnummer Part number
N	Kuppler / female	SMA	Stecker / male	20.7 mm	0.028 kg	**BN 64 06 82**
N	Kuppler / female	N	Kuppler / female	36.2 mm	0.040 kg	**BN 29 37 50**
7-16	Stecker / male	N	Stecker / male	30.7 mm	0.083 kg	**BN 29 38 00**
7-16	Stecker / male	N	Kuppler / female	15.3 mm	0.073 kg	**BN 19 44 00**
7-16	Kuppler / female	N	Stecker / male	34.9 mm	0.074 kg	**BN 29 39 00**
7-16	Kuppler / female	N	Kuppler / female	24.5 mm	0.078 kg	**BN 29 40 00**
7-16	Kuppler / female	7-16	Kuppler / female	29.0 mm	0.088 kg	**BN 19 64 00**
7/8"	EIA	N	Kuppler / female	59.1 mm	0.25 kg	**BN 90 25 00**
7/8"	EIA	7-16	Kuppler / female	58.2 mm	0.24 kg	**BN 80 56 00**
7/8"	EIA	7-16	Stecker / male	47.2 mm	0.24 kg	**BN 81 80 00**
13-30	Stecker / male	7-16	Kuppler / female	61.7 mm	0.45 kg	**BN 90 83 00**
1 5/8"	EIA	N	Kuppler / female	84.7 mm	0.81 kg	**BN 90 36 00**
1 5/8"	EIA	7-16	Kuppler / female	82.4 mm	0.86 kg	**BN 90 92 00**
1 5/8"	EIA	7/8	EIA	108.5 mm	1.13 kg	**BN 91 21 00**
1 5/8"	EIA	13-30	Kuppler / female	115.9 mm	1.21 kg	**BN 91 43 00**
1 5/8"	EIA	13-30	Stecker / male	105.5 mm	1.19 kg	**BN 91 42 00**
3 1/8"	EIA	N	Kuppler / female	113.0 mm	2.28 kg	**BN 94 57 00**
3 1/8"	EIA	7-16	Kuppler / female	119.7 mm	2.40 kg	**BN 90 93 08**
3 1/8"	EIA	1 5/8"	EIA	152.0 mm	3.49 kg	**BN 91 75 00**
4 1/2"	EIA[1)]	7-16	Kuppler / female	180.0 mm	4.66 kg	**BN 72 89 00**
4 1/2"	EIA[1)]	3 1/8"	EIA	177.0 mm	5.69 kg	**BN 71 50 00**
6 1/8"	EIA	3 1/8"	EIA	194.0 mm	8.15 kg	**BN 91 89 00**

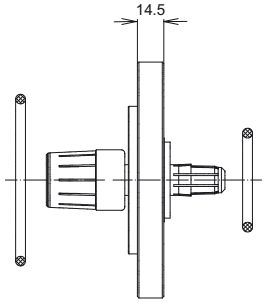


Typische Zeichnung
Typical drawing

Übergänge in Kurzbauweise, mit eingebautem Kupplungselement
Adaptors in short length version, with built-in coupling element

Anschluss 1 Connector 1		Anschluss 2 Connector 2		Länge L Length L	Gewicht Weight	Bestellnummer Part number
1 5/8"	EIA	7-16	Kuppler / female	34.9 mm	0.61 kg	BN 10 74 10
1 5/8"	EIA	7/8"	EIA	24.00 mm	0.83 kg	BN 91 21 10
3 1/8"	EIA	1 5/8"	EIA	15.00 mm	2.01 kg	BN 91 75 10
4 1/2"	EIA1)	3 1/8"	EIA	21.75 mm	3.50 kg	BN 71 50 10
6 1/8"	EIA	7-16	Kuppler / female	109.9 mm	6.51 kg	BN 90 94 04
6 1/8"	EIA	3 1/8"	EIA	35.75 mm	5.73 kg	BN 91 89 10
6 1/8"	EIA	4 1/2"	EIA[1)]	39.95 mm	6.28 kg	BN 71 49 10

[1)] 339 IEC 50-105



Typische Zeichnung
Typical drawing

SMS- und BT-Übergangsverbinder sind bei den jeweiligen Rohrleitungsgrößen aufgeführt
SMS- and BT-adaptors are listed at the corresponding rigid line sizes

Data subject to change without notice – Edition E

MESSTRENNSTÜCKE
DIRECT ACCESS UNITS

- schneller und direkter Zugang zu den Koaxial-Anschlüssen
- präzise Messungen von VSWR und elektrischer Länge über galvanische Kontakte
- Antennentest und Antennenabgleich ohne Zerlegen der Anschlussleitungen
- für Außenmontage
- für alle Rundfunk- und Fernsehstandards geeignet

- quick and direct access to coaxial line ports
- accurate measurements of VSWR and electrical length via galvanic contacts
- antenna testing and tuning without dismantling the connected feeders
- for outdoor application
- suitable for all broadcast standards

Bestellnummer Part number		**BN 39 09 06**	**BN 84 77 12**	**BN 84 77 10**	**BN 87 66 10**	**BN 87 67 06**
Frequenzbereich Frequency range		0 - 860 MHz	0 - 860 MHz	0 - 860 MHz	0 - 860 MHz	0 - 860 MHz
Prüfspannung [1] Proof voltage [1]		7.0 kV	12.0 kV	14.0 kV	18.0 kV	22.0 kV
Effektive Leistung [2] Average power [2]	100 MHz 230 MHz 860 MHz	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW	≤ 51.0 kW ≤ 34.0 kW ≤ 17.5 kW	≤ 67.0 kW ≤ 44.0 kW ≤ 23.0 kW	≤ 98.0 kW ≤ 64.0 kW ≤ 35.0 kW	≤ 140.0 kW ≤ 92.0 kW ≤ 47.0 kW
VSWR		≤ 1.02				
Anschlüsse Connectors		1 5/8“ EIA	3 1/8“ EIA	3 1/8“ EIA	4 1/2“ EIA 339 IEC 50-105	6 1/8" EIA
Länge Length		240.0 mm	350.6 mm	358.0 mm	360.0 mm	520.0 mm
Gewicht Weight		3.67 kg	6.80 kg	6.50 kg	13.00 kg	20.50 kg
Passender Messeinsatz Corresponding measurement insert		BN 49 59 51	BN 29 09 03	BN 59 03 02	BN 59 03 02	BN 31 54 01
Messanschlüsse Measuring connectors		7-16 Kuppler 7-16 female				
Gewicht Weight		1.97 kg	2.79 kg	5.22 kg	5.22 kg	7.23. kg

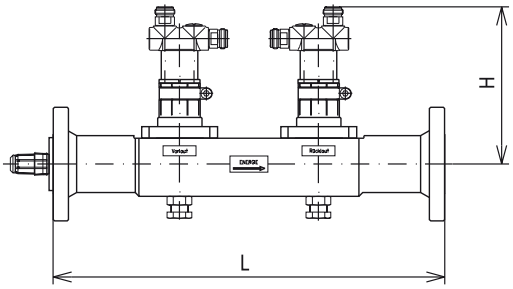
[1] Auf Meereshöhe, 86 - 106 kPa
At sea level, 86 - 106 kPa
[2] Bei +40 °C Umgebungstemperatur
At +40 °C ambient temperature

DOPPEL-MESSRICHTKOPPLER

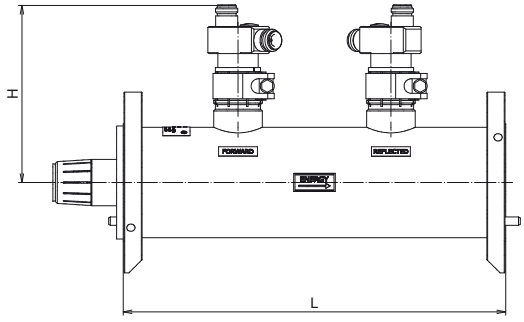
DIRECTIONAL COUPLERS WITH TWO PROBES

- kompakte Bauform
- verwendbar in einem weiten Frequenzbereich
- variable Koppeldämpfung
- niedriges VSWR
- hohe Directivity
- für Innenraummontage

- compact design
- suitable in a wide frequency range
- variable coupling
- low VSWR
- high directivity
- for indoor application



BN 80 08 29



BN 80 02 64

Bestellnummer Part number		**BN 80 08 29**	**BN 80 02 64**	**BN 80 03 64**	**BN 51 67 58**	**BN 51 67 64**
Frequenzbereich Frequency range		40 - 860 MHz	40 - 860 MHz	40 - 860 MHz	40 - 860 MHz	40 - 800 MHz
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		≤ 7 kV	≤ 14 kV	≤ 19 kV	≤ 22 kV	≤ 28 kV
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 860 MHz	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW	≤ 67 kW ≤ 44 kW ≤ 23 kW	≤ 112 kW ≤ 74 kW ≤ 38 kW	≤ 170 kW ≤ 116 kW ≤ 60 kW	≤ 224 kW ≤ 148 kW ≤ 78 kW (800 MHz)
Kopplungsbereich Coupling range	100 MHz 230 MHz 860 MHz	38 - 72 dB 31 - 64 dB 25 - 53 dB	42 - 74 dB 35 - 67 dB 29 - 57 dB	46 - 78 dB 38 - 71 dB 32 - 60 dB	48 - 82 dB 42 - 75 dB 34 - 64 dB	49.5 - 81 dB 43.0 - 74 dB 31 - 63 dB (800 MHz)
VSWR Hauptleitung VSWR main line		≤ 1.04				
Directivity		34 - 40 dB				
Durchgangsdämpfung Insertion loss		≤ 0.05 dB				
Anschlüsse Hauptleitung Connectors main line		1 5/8" EIA male/female	3 1/8" EIA [2] male/female	4 1/2" EIA [2] male/female 339 IEC 50-105	52 - 120 BT male/female	6 1/8" EIA male/female
Anschlüsse gekoppelte Leitung Connectors coupled line		2 x N Kuppler 2 x N female				
Abschlusswiderstand (separate Bestellung) Termination load (separate ordering)		Die Koppeldämpfung ist so zu wählen, dass an keinem Anschluss der gekoppelten Leitung mehr als 1 W ausgekoppelt wird. Please take care that with the chosen coupling not more than 1 W appears at a port of the coupled line.				
Abmessungen (L x H) mm Dimensions (L x H) mm		310 x 125	275 x 160	275 x 166	330 x 172	400 x 213
Gewicht Weight		3.55 kg	4.3 kg	5.4 kg	7.0 kg	12.8 kg

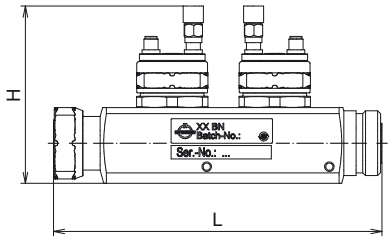
[1] Bei +40 °C Umgebungstemperatur
At +40 °C ambient temperature
[2] Kupplungselement kann entfernt werden
Coupling element can be removed

Data subject to change without notice – Edition E

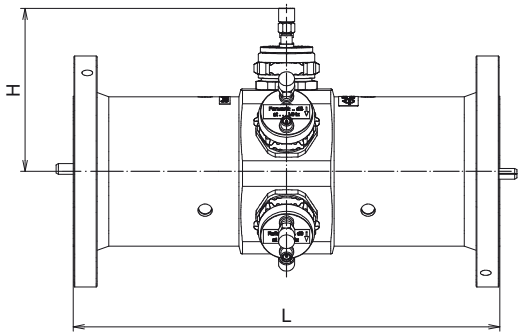
MESSRICHTKOPPLER (1...5 MESS-STELLEN)
DIRECTIONAL COUPLERS (1...5 PROBES)

- extrem kompakte Bauform
- verwendbar in einem weiten Frequenzbereich
- variable Koppeldämpfung
- niedriges VSWR
- hohe Directivity
- für Innenraummontage

- extremely compact design
- suitable in a wide frequency range
- variable coupling
- low VSWR
- high directivity
- for indoor application



BN 80 04 68



BN 80 02 65 C0005

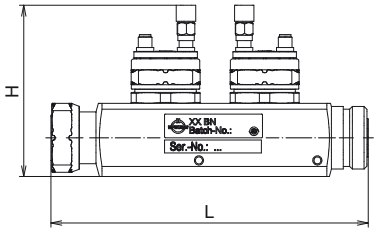
Bestellnummer **Part number**	**1-fach / -way** **2-fach / -way** **3-fach / -way** **4-fach / -way** **5-fach / -way**	**—** **BN 80 04 68** **—** **—** **—**	**BN 80 08 65 C0001** **BN 80 08 65 C0002** **BN 80 08 65 C0003** **—** **—**	**—** **BN 80 02 65 C0002** **BN 80 02 65 C0003** **BN 80 02 65 C0004** **BN 80 02 65 C0005**	**—** **BN 80 03 65 C0002** **BN 80 03 65 C0003** **BN 80 03 65 C0004** **BN 80 03 65 C0005**
Frequenzbereich Frequency range		40 - 860 MHz			
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)		≤ 3 kV	≤ 7 kV	≤ 14 kV	≤ 19 kV
Effektive Leistung [1] Average power [1]	100 MHz 230 MHz 860 MHz	≤ 5.3 kW ≤ 3.8 kW ≤ 2.0 kW	≤ 20.0 kW ≤ 13.5 kW ≤ 7.0 kW	≤ 67 kW ≤ 44 kW ≤ 23 kW	≤ 112 kW ≤ 74 kW ≤ 38 kW
Kopplungsbereich Coupling range	100 MHz 230 MHz 860 MHz	51 - 75 dB 45 - 69 dB 36 - 57 dB	58 - 86 dB 52 - 80 dB 43 - 68 dB	61 - 91 dB 56 - 85 dB 47 - 73 dB	65 - 96 dB 60 - 90 dB 51 - 78 dB
VSWR Hauptleitung VSWR main line		≤ 1.04			
Directivity		34 - 40 dB			
Durchgangsdämpfung Insertion loss		≤ 0.05 dB			
Anschlüsse Hauptleitung Connectors main line		7-16 Stecker/Kuppler 7-16 male/female	1 5/8" EIA female/female	3 1/8" EIA female/female	4 1/2" EIA female/female 339 IEC 50-105
Anschlüsse gekoppelte Leitung Connectors coupled line		SMA Kuppler SMA female			
Abschlusswiderstand 1W incl. Termination load 1 W incl.		Die Koppeldämpfung ist so zu wählen, dass an keinem Anschluss der gekoppelten Leitung mehr als 1 W ausgekoppelt wird. Please take care that with the chosen coupling not more than 1 W appears at a port of the coupled line.			
Abmessungen (L x H) mm Dimensions (L x H) mm		148 x 98.5	150 x 92	240 x 110.5	300 x 122.5
Gewicht Weight		0.6 kg	1.1 kg	3.5 kg	5.3 kg

[1] Bei +40 °C Umgebungstemperatur
At +40 °C ambient temperature

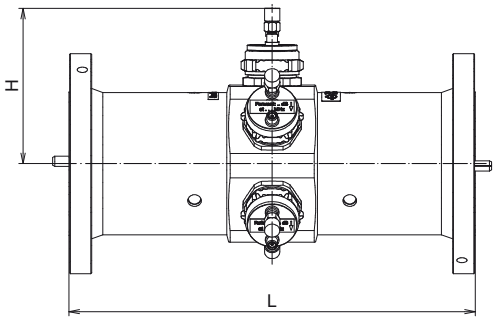
MESSRICHTKOPPLER, FREQUENZGANGKOMPENSIERT (1...5 MESS-STELLEN)
DIRECTIONAL COUPLERS, FREQUENCY RESPONSE COMPENSATED (1...5 PROBES)

- extrem kompakte Bauform
- verwendbar in einem weiten Frequenzbereich
- variable Koppeldämpfung
- niedriges VSWR
- Messstellensignal frequenzunabhängig
- hohe Directivity
- für Innenraummontage

- extremely compact design
- suitable in a wide frequency range
- variable coupling
- low VSWR
- probe signal frequency independent
- high directivity
- for indoor application



BN 80 04 68 C2002



BN 80 02 65 C2005

Bestellnummer / Part number	**1-fach / -way**	**2-fach / -way**	**3-fach / -way**	**4-fach / -way**	**5-fach / -way**
	—	**BN 80 04 68 C2002**	**—**	**—**	**—**
	BN 80 08 65 C2001	**BN 80 08 65 C2002**	**BN 80 08 65 C2003**	**—**	**—**
	—	**BN 80 02 65 C2002**	**BN 80 02 65 C2003**	**BN 80 02 65 C2004**	**BN 80 02 65 C2005**
	—	**BN 80 03 65 C2002**	**BN 80 03 65 C2003**	**BN 80 03 65 C2004**	**BN 80 03 65 C2005**
Frequenzbereich Frequency range	470 - 860 MHz				
Prüfspannung auf Meereshöhe (NN) Proof voltage at sea level (NN)	≤ 3 kV	≤ 7 kV	≤ 14 kV	≤ 19 kV	
Effektive Leistung [1] Average power [1]	≤ 2 kW	≤ 7 kW	≤ 23 kW	≤ 38 kW	
Kopplungsbereich Coupling range	40 - 68 dB	50 - 78 dB	54 - 80 dB	56 - 80 dB	
Variation der Koppeldämpfung Coupling variation	± 0.15 dB (bei einem VSWR < 1.02 am Anschluss der Messstelle / at VSWR < 1.02 at the probe port)				
VSWR Hauptleitung VSWR main line	≤ 1.04				
Directivity	34 - 40 dB				
Durchgangsdämpfung Insertion loss	≤ 0.05 dB				
Anschlüsse Hauptleitung Connectors main line	7-16 Stecker/Kuppler 7-16 male/female	1 5/8" EIA female/female	3 1/8" EIA female/female	4 1/2" EIA female/female 339 IEC 50-105	
Anschlüsse gekoppelte Leitung Connectors coupled line	SMA Kuppler SMA female				
Abschlusswiderstand 1W incl. Termination load 1 W incl.	Die Koppeldämpfung ist so zu wählen, dass an keinem Anschluss der gekoppelten Leitung mehr als 1 W ausgekoppelt wird. Please take care that with the chosen coupling not more than 1 W appears at a port of the coupled line.				
Abmessungen (L x H) mm Dimensions (L x H) mm	148 x 98.5	150 x 92	240 x 110.5	300 x 122.5	
Gewicht Weight	0.6 kg	1.1 kg	3.5 kg	5.3 kg	

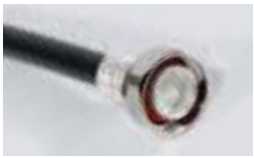
[1] Bei +40 °C Umgebungstemperatur
At +40 °C ambient temperature

Data subject to change without notice – Edition E

MESSMITTEL ZUBEHÖR
MEASUREMENT ACCESSORIES

- Kalibrier Kits erhöhen die Genauigkeit von Messungen (Directivity, Rückflussdämpfung, Einfügedämpfung)
- Präzisions-Übergänge haben verbesserte Oberflächen für viele Steckvorgänge
- Präzisions-Übergänge haben keine O-Ringe und sind besser handhabbar
- Offene Eingänge sollten mit Präzisions-Widerständen abgeschlossen werden, um Messfehler durch Reflexionen zu vermeiden

- Calibration kits increase the accuracy of measurements (directivity, return loss, insertion loss)
- Precision adaptors have improved surfaces for many mating cycles
- Precision adaptors have no O-rings for quicker handling
- Open ports should be terminated by precision loads to avoid measurement errors by reflections

Product	Description	Part number	
4-1 OSLT calibration kit 50 Ω 7-16 female 0 ≤ f ≤ 6 GHz incl. test report	For calibrating directly on 7-16 male connectors. Includes all required standards for multiport calibration (open, short, load & thru) in one compact unit.	**BN 53 38 45**	
4-1 OSLT calibration kit 50 Ω N female 0 ≤ f ≤ 6 GHz incl. test report	For calibrating directly on N-male connectors. Includes all required standards for multiport calibration (open, short, load & thru) in one compact unit.	**BN 53 38 43**	
Precision measurement adapter 7-16 male / N female 0 ≤ f ≤ 7.5 GHz incl. test report	Hard wearing center conductor, gold plated, for highest durability. For measurement use with inproved surfaces for many cycles. return loss 0 - 3.0 GHz > 40 dB 0 - 7.5 GHz > 36 dB	**BN 19 44 03**	
Measurement cable SUCOTEST 3.0 m N male / N male 0 ≤ f ≤ 18 GHz	For harsh environments and many mating cycles. return loss 0 - 2 GHz > 30 dB 0 - 18 GHz > 19 dB	**BN A7 36 22**	
Measurement cable SF3/8" 4.5 m 7-16 male / 7-16 male 0 ≤ f ≤ 2.2 GHz	For intermodulation measurements IM3 ≤ -160 dBc with 2 x 20 W return loss 0 - 0.9 GHz > 32 dB 0 - 2.2 GHz > 28 dB	**BN J5 00 04**	
Precision load 1 W 7-16 male 0 ≤ f ≤ 5 GHz	For termination of open 7-16 female ports. return loss 0 - 1 GHz > 40 dB 0 - 5 GHz > 26 dB	**BN 19 36 90**	
Precision load 1 W N male 0 ≤ f ≤ 5 GHz	For termination of open N female ports. return loss 0 - 1 GHz > 40 dB 0 - 5 GHz > 26 dB	**BN 39 24 90**	
Attenuator 5 W / 10 dB N male / N female 0 ≤ f ≤ 12 GHz	To protect test equipment from unknown high power signals. Recommended for measurements on high power transmitter sites. return loss 0 - 4 GHz > 23 dB 0 - 12 GHz > 15 dB	**BN 52 86 26**	
Attenuator 5 W / 20 dB N male / N female 0 ≤ f ≤ 12 GHz	To protect test equipment from unknown high power signals. Recommended for measurements on high power transmitter sites. return loss 0 - 4 GHz > 23 dB 0 - 12 GHz > 15 dB	**BN 52 86 27**	

ABSCHLUSSWIDERSTÄNDE
LOADS

Abschlusswiderstände werden in vielen Rundfunkbereichen benötigt und typischerweise als Brückenabsorber für 3 dB Koppler oder als Kunstantennen für Testzwecke verwendet. Bis zu einer effektiven Leistung von 2,5 kW reicht zur Kühlung die natürliche Luftkonvektion (Außnahme: Widerstände ohne Kühlkörper müssen geeignet gekühlt werden). Abschlusswiderstände für 2,5 kW und 5 kW sind mit Lüftern ausgerüstet, für die ein 1-phasiger 230V ± 10 %, 50/60 Hz Netzanschluss benötigt wird. Die 10 kW, 20 kW und 30 kW Modelle sind mit einem Flüssigkeits-Kühlsystem mit integriertem Flüssigkeits-Luft-Wärmetauscher inklusive Gebläse ausgestattet. Die Stromversorgung erfolgt über einen 3-phasigen 400V ± 5 %, 50/60Hz Netzanschluss. Alle Abschlusswiderstände mit Netzanschluss verfügen über Sensoren für eine Interlockschleife.
Alle Abschlusswiderstände sind für Innenraummontage vorgesehen (IP40).

Unsere Abschlusswiderstände sind mindestens bis zu einer Umgebungstemperatur von +40 °C mit der angegeben effektiven Leistung belastbar, wo es sinnvoll ist, haben wir für höhere Umgebungstemperaturen Derating-Kurven abgebildet.

- Rote Kurve: zeigt die zulässige maximale Belastung sowie Richtwerte für die Oberflächentemperatur in Abhängigkeit von der Umgebungstemperatur. Der Temperaturverlauf zwischen den angegebenen Oberflächentemperaturen ist monoton. Die Oberflächentemperatur kann je nach Leistungsklasse an den heißesten Stellen bis zu +180 °C erreichen.
- Blaue Kurve: zeigt Richtwerte für die zulässige maximale Belastung in Abhängigkeit von der Umgebungstemperatur bei einer Oberflächentemperatur von circa +80 °C.
- Grüne Kurve: zeigt Richtwerte für die zulässige maximale Belastung in Abhängigkeit von der Umgebungstemperatur bei einer Oberflächentemperatur von circa +60 °C.

Alle Angaben gelten für einen Normaldruck von circa 1.000 hPa und einer relativen Luftfeuchtigkeit von 50 % auf Meereshöhe.

Loads are needed in many Broadcast applications and are typically used as balancing loads for the isolated port of directional couplers or as dummy loads for testing purposes. The loads with a power handling of up to 2.5 kW (average) are designed for normal convection cooling (exception: loads without heat sink must be cooled appropriately).
The 2.5 kW and 5 kW loads have an integrated blower for forced air cooling and operate with a single phase 230V ± 10 %, 50/60 Hz mains connection. Our 10 kW, 20 kW and 30 kW loads have an integrated liquid coolant system with a liquid-air heat exchanger including a blower.
The power is provided by a 3 phase 400V ± 5 %, 50/60 Hz connection. SPINNER loads with a mains connection are equipped with sensors for an interlock-loop.
All loads are designed for indoor application (IP40).

Our loads are specified for full power at ambient temperatures of at least +40 °C, for higher ambient temperatures power derating curves are supplied, when prudent.

- Red curve: shows the maximal permissible power handling and reference values for the surface temperature over ambient temperature. The temperature behaviour between given surface temperatures is monotonic. Depending on the power range, the surface temperature can reach up to +180 °C at the hottest spots.
- Blue curve: shows reference values for power handling over ambient temperature with a surface temperature of approximately +80 °C.
- Green curve: shows reference values for power handling over ambient temperature with a surface temperature of approximately +60 °C.

The given data is valid for a normal air pressure of approx. 1,000 hPa and a relative air humidity of 50 % at sea level.

KOAXIALE ABSCHLUSSWIDERSTÄNDE
COAXIAL LOADS

KONVEKTIONSGEKÜHLT
CONVECTION COOLED

Frequenzbereich Frequency range	Effektive Leistung Average power
0 - 5 GHz	≤ 1 W
0 - 7 GHz	≤ 5 W
0 - 7 GHz	≤ 10 W
0 - 7 GHz	≤ 25 W
0 - 860 MHz	≤ 50 W
0 - 860 MHz	≤ 100 W
0 - 860 MHz	≤ 200 W
0 - 860 MHz	≤ 400 W
0 - 860 MHz	≤ 600 W
0 - 860 MHz	≤ 1.0 kW
0 - 4476 MHz	≤ 1.6 kW
0 - 860 MHz	≤ 2.0 kW
0 - 860 MHz	≤ 2.5 kW

KONVEKTIONSGEKÜHLT, OHNE KÜHLKÖRPER
CONVECTION COOLED, WITHOUT HEAT SINK

Frequenzbereich Frequency range	Effektive Leistung Average power
0 - 860 MHz	≤ 625 W
0 - 860 MHz	≤ 1.25 kW
0 - 860 MHz	≤ 2.5 kW

ZWANGSLUFTKÜHLUNG
FORCED AIR COOLING

Frequenzbereich Frequency range	Effektive Leistung Average power
0 - 860 MHz	≤ 2.5 kW
0 - 860 MHz	≤ 5.0 kW

FLÜSSIGKEITS-ZWANGSLUFTGEKÜHLT
LIQUID-FORCED AIR COOLING

Frequenzbereich Frequency range	Effektive Leistung Average power
0 - 860 MHz	≤ 10 kW
0 - 860 MHz	≤ 20 kW
0 - 860 MHz	≤ 30 kW

FLÜSSIGKEITSGEKÜHLT, OHNE WÄRMETAUSCHER
LIQUID COOLED, WITHOUT HEAT EXCHANGER

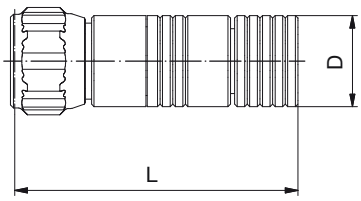
Frequenzbereich Frequency range	Effektive Leistung Average power
0 - 860 MHz	≤ 38 kW
0 - 860 MHz	≤ 45 kW

Data subject to change without notice – Edition E

1 W ABSCHLUSSWIDERSTÄNDE
1 W LOADS

- konvektionsgekühlt
- bleifrei
- BeO-frei
- kompakt
- für Innenraummontage

- convection-cooled
- lead-free
- BeO-free
- compact
- for indoor application

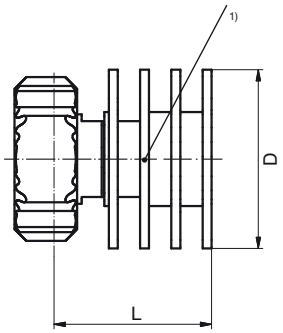


Bestellnummer Part number		**BN 39 24 90**	**BN 19 36 90**
Frequenzbereich Frequency range		0 ≤ f ≤ 5 GHz	
VSWR	0 ≤ f ≤ 1 GHz 1 ≤ f ≤ 3 GHz 3 ≤ f ≤ 5 GHz	≤ 1.02 ≤ 1.06 ≤ 1.10	
Effektive Leistung Average power		≤ 1 W	
Prüfspannung Proof voltage		≤ 50 V	
Anschlüsse Connectors		N Stecker N male	7-16 Stecker 7-16 male
Umgebungstemperatur Ambient temperature		-40 °C ≤ ϑ ≤ +60 °C	
Abmessungen (L x D) mm Dimensions (L x D) mm		56 x 18	44 x 18
Gewicht Weight		ca. 80 g	ca. 120g
Einbaulage Operation position		beliebig any	

5 W, 10 W ABSCHLUSSWIDERSTÄNDE
5 W, 10 W LOADS

- konvektionsgekühlt
- bleifrei
- kompakt
- für Innenraummontage

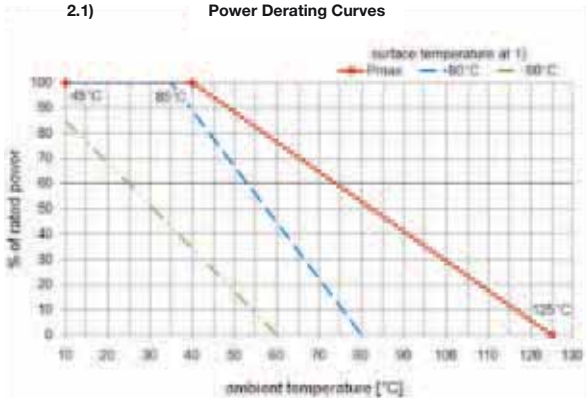
- convection-cooled
- lead-free
- compact
- for indoor application



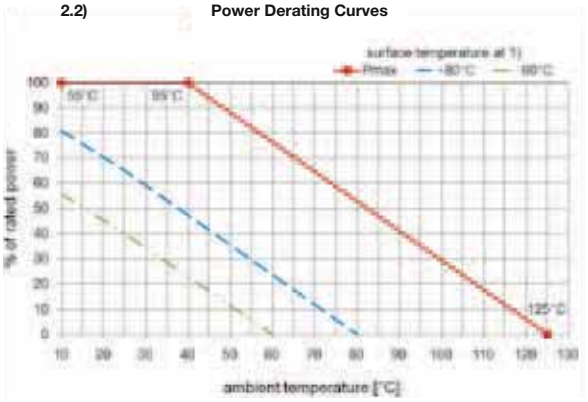
Bestellnummer Part number	**BN 53 17 27**	**BN 53 17 12**	**BN 53 12 21**	**BN 53 12 25**
Frequenzbereich Frequency range	0 ≤ f ≤ 7 GHz			
VSWR 0 ≤ f ≤ 1 GHz 1 ≤ f ≤ 2 GHz 2 ≤ f ≤ 5 GHz 5 ≤ f ≤ 7 GHz	≤ 1.06 ≤ 1.11 ≤ 1.17 ≤ 1.22			
Effektive Leistung Average power	≤ 5 W [2.1)]		≤ 10 W [2.2)]	
Prüfspannung Proof voltage	≤ 1000 V			
Anschlüsse Connectors	N Stecker N male	7-16 Stecker 7-16 male	N Stecker N male	7-16 Stecker 7-16 male
Umgebungstemperatur Ambient temperature	-40 °C ≤ ϑ ≤ +40 °C [2.1/2.2)]			
Abmessungen (L x D) mm Dimensions (L x D) mm	35.5 x 24	26.3 x 24	44.5 x 40	35.3 x 40
Gewicht Weight	ca. 40 g	ca. 100 g	ca. 80 g	ca. 130 g
Einbaulage Operation position	beliebig any			

[1)] Messpunkt für Oberflächentemperatur, siehe Zeichnung
Measuring point for surface temperature, see drawing
[2)] Die Anschlussleistung reduziert sich bei steigender Umgebungstemperatur wie folgt
The maximum power handling is reduced with rising ambient temperatures as follows

2.1) Power Derating Curves



2.2) Power Derating Curves

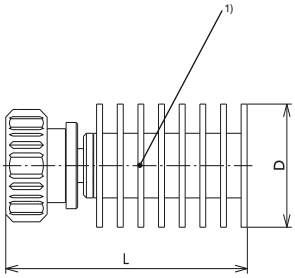


Data subject to change without notice – Edition E

25 W ABSCHLUSSWIDERSTÄNDE
25 W LOADS

- konvektionsgekühlt
- bleifrei
- kompakt
- für Innenraummontage

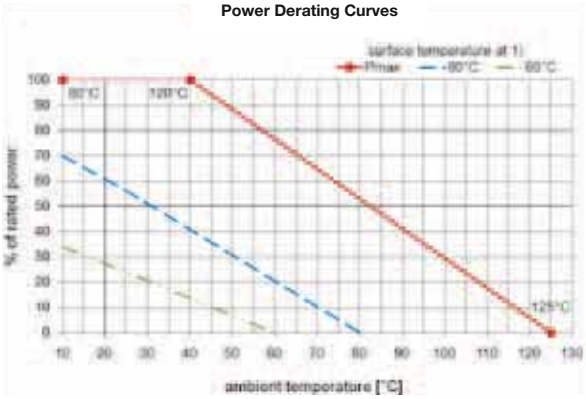
- convection-cooled
- lead-free
- compact
- for indoor application



Bestellnummer Part number	**BN 52 77 57**			
Frequenzbereich Frequency range	0 ≤ f ≤ 1 GHz	1 < f ≤ 2 GHz	2 < f ≤ 5 GHz	5 < f ≤ 7 GHz
VSWR	≤ 1.06	≤ 1.11	≤ 1.17	≤ 1.22
Effektive Leistung Average power	≤ 25 W [2]			
Prüfspannung Proof voltage	≤ 1000 V			
Anschlüsse Connectors	7-16 Stecker 7-16 male			
Umgebungstemperatur Ambient temperature	-40 °C ≤ ϑ ≤ +40 °C [2]			
Abmessungen (L x D) mm Dimensions (L x D) mm	63.3 x 40			
Gewicht Weight	ca. 200 g			
Einbaulage Operation position	beliebig any			

[1] Messpunkt für Oberflächentemperatur, siehe Zeichnung
Measuring point for surface temperature, see drawing
[2] Die Anschlussleistung reduziert sich bei steigender Umgebungstemperatur wie folgt
The maximum power handling is reduced with rising ambient temperatures as follows

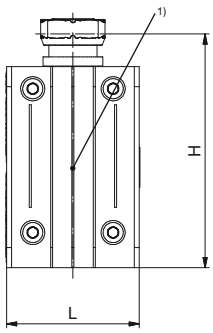
Power Derating Curves



50 W ABSCHLUSSWIDERSTÄNDE
50 W LOADS

- konvektionsgekühlt
- bleifrei
- kompakt
- für Innenraummontage

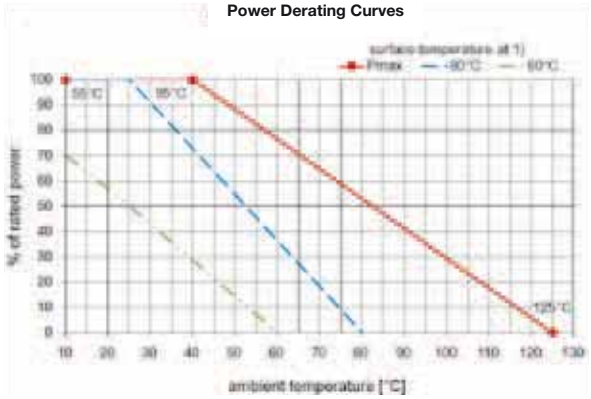
- convection-cooled
- lead-free
- compact
- for indoor application



Bestellnummer **Part number**	**BN 53 77 11**
Frequenzbereich Frequency range	0 ≤ f ≤ 860 MHz
VSWR	≤ 1.06
Effektive Leistung Average power	≤ 50 W [2]
Prüfspannung Proof voltage	≤ 1200 V
Anschlüsse Connectors	7-16 Stecker 7-16 male
Umgebungstemperatur Ambient temperature	-40 °C ≤ ϑ ≤ +40 °C [2]
Abmessungen (L x B x H) mm Dimensions (L x B x H) mm	66 x 93 x 116
Gewicht Weight	ca. 1.0 kg
Einbaulage Operation position	Kühlrippen senkrecht Cooling fins vertically

[1] Messpunkt für Oberflächentemperatur, siehe Zeichnung
Measuring point for surface temperature, see drawing
[2] Die Anschlussleistung reduziert sich bei steigender Umgebungstemperatur wie folgt
The maximum power handling is reduced with rising ambient temperatures as follows

Power Derating Curves

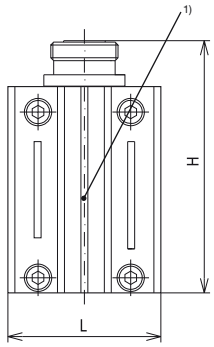


Data subject to change without notice – Edition E

100 W ABSCHLUSSWIDERSTÄNDE
100 W LOADS

- konvektionsgekühlt
- bleifrei
- kompakt
- für Innenraummontage

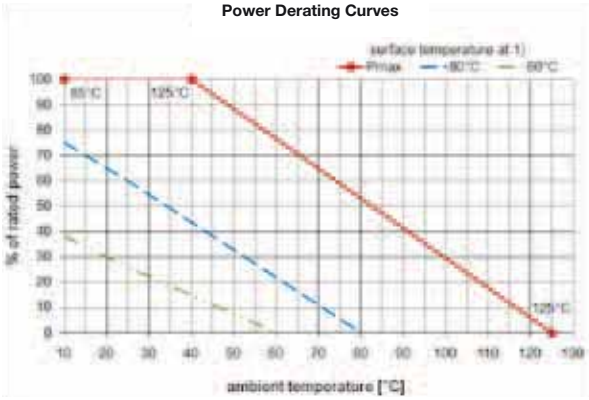
- convection-cooled
- lead-free
- compact
- for indoor application



Bestellnummer Part number	BN 53 77 21	BN 53 77 20
Frequenzbereich Frequency range	0 ≤ f ≤ 860 MHz	
VSWR	≤ 1.06	
Effektive Leistung Average power	≤ 100 W [2]	
Prüfspannung Proof voltage	≤ 1200 V	
Anschlüsse Connectors	7-16 Stecker 7-16 male	7-16 Kuppler 7-16 female
Umgebungstemperatur Ambient temperature	-40 °C ≤ ϑ ≤ +40 °C [2]	
Abmessungen (L x B x H) mm Dimensions (L x B x H) mm	66 x 113 x 123.9	66 x 113 x 119.8
Gewicht Weight	ca. 1.2 kg	
Einbaulage Operation position	Kühlrippen senkrecht Cooling fins vertically	

[1] Messpunkt für Oberflächentemperatur, siehe Zeichnung
Measuring point for surface temperature, see drawing
[2] Die Anschlussleistung reduziert sich bei steigender Umgebungstemperatur wie folgt
The maximum power handling is reduced with rising ambient temperatures as follows

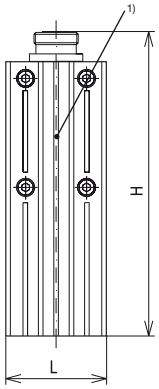
Power Derating Curves



200 W ABSCHLUSSWIDERSTÄNDE
200 W LOADS

- konvektionsgekühlt
- bleifrei
- kompakt
- für Innenraummontage

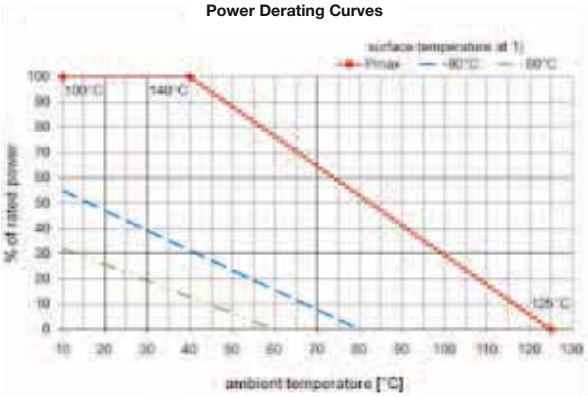
- convection-cooled
- lead-free
- compact
- for indoor application



Bestellnummer **Part number**	**BN 53 77 30**
Frequenzbereich Frequency range	0 ≤ f ≤ 860 MHz
VSWR	≤ 1.06
Effektive Eingangsleistung Average input	≤ 200 W [2]
Prüfspannung Proof voltage	≤ 1200 V
Anschlüsse Connectors	7-16 Kuppler 7-16 female
Umgebungstemperatur Ambient temperature	-40 °C ≤ ϑ ≤ +40 °C [2]
Abmessungen (L x B x H) mm Dimensions (L x B x H) mm	66 x 113 x 219.9
Gewicht Weight	ca. 2 kg
Einbaulage Operation position	Kühlrippen senkrecht Cooling fins vertically

[1] Messpunkt für Oberflächentemperatur, siehe Zeichnung
Measuring point for surface temperature, see drawing
[2] Die Anschlussleistung reduziert sich bei steigender Umgebungstemperatur wie folgt
The maximum power handling is reduced with rising ambient temperatures as follows

Power Derating Curves

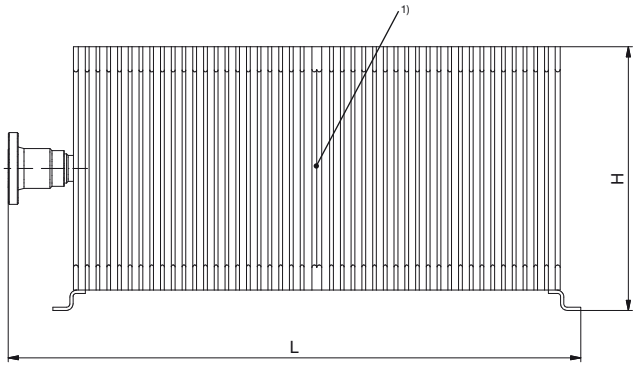


Data subject to change without notice – Edition E

400 W, 600 W, 1 kW, 2 kW ABSCHLUSSWIDERSTÄNDE
400 W, 600 W, 1 kW, 2 kW LOADS

- konvektionsgekühlt
- bleifrei
- kompakt
- für Innenraummontage

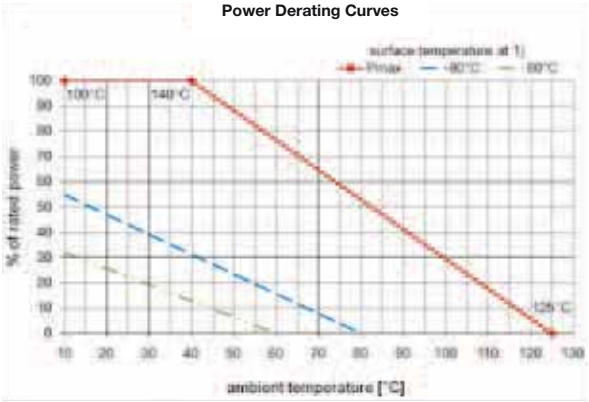
- convection-cooled
- lead-free
- compact
- for indoor application



Bestellnummer Part number	BN 53 77 40	BN 53 77 50	BN 53 77 61	BN 53 77 70
Frequenzbereich Frequency range	0 ≤ f ≤ 860 MHz			
VSWR	≤ 1.06			
Effektive Leistung Average power	≤ 400 W 2)	≤ 600 W 2)	≤ 1 kW 2)	≤ 2 kW 2)
Prüfspannung Proof voltage	≤ 1.2 kV	≤ 2 kV		≤ 2 kV
Anschlüsse Connectors	7-16 Kuppler 7-16 female			1 5/8"EIA
Umgebungstemperatur Ambient temperature	-40 °C ≤ ϑ ≤ +40 °C 2)			
Abmessungen (L x B x H) mm Dimensions (L x B x H) mm	269 x 113 x 275	289 x 113 x 325	340 x 199 x 325	706 x 210 x 325
Gewicht Weight	ca. 5 kg	ca. 6 kg	ca. 14 kg	ca. 32 kg
Einbaulage Operation position	Kühlrippen senkrecht Cooling fins vertically			

1) Messpunkt für Oberflächentemperatur, siehe Zeichnung
Measuring point for surface temperature, see drawing
2) Die Anschlussleistung reduziert sich bei steigender Umgebungstemperatur wie folgt
The maximum power handling is reduced with rising ambient temperatures as follows

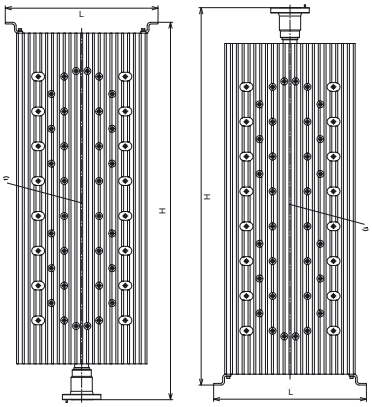
Power Derating Curves



2,5 kW ABSCHLUSSWIDERSTÄNDE
2.5 kW LOADS

- konvektionsgekühlt
- bleifrei
- kompakt
- für Innenraummontage

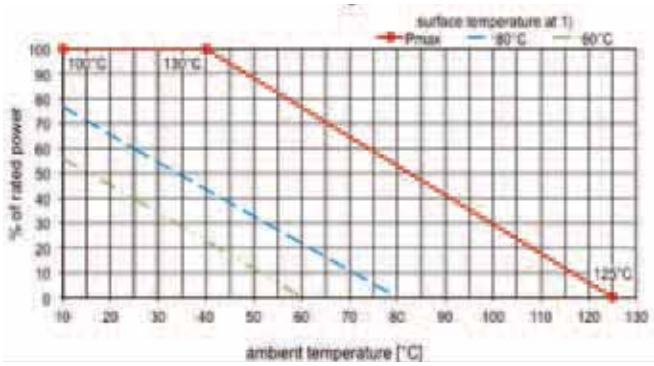
- convection-cooled
- lead-free
- compact
- for indoor application



Bestellnummer Part number	**BN 53 77 94**
Frequenzbereich Frequency range	0 ≤ f ≤ 860 MHz
VSWR	≤ 1.10
Effektive Leistung Average power	≤ 2.5 kW [2]
Prüfspannung Proof voltage	≤ 2.5 kV
Anschlüsse Connectors	1 5/8"EIA
Umgebungstemperatur Ambient temperature	-40 °C ≤ ϑ ≤ +40 °C [2]
Abmessungen (L x B x H) mm Dimensions (L x B x H) mm	300 x 215 x 843
Gewicht Weight	ca. 32 kg
Einbaulage Operation position	Kühlrippen senkrecht Cooling fins vertically

[1] Messpunkt für Oberflächentemperatur, siehe Zeichnung
Measuring point for surface temperature, see drawing
[2] Die Anschlussleistung reduziert sich bei steigender Umgebungstemperatur wie folgt
The maximum power handling is reduced with rising ambient temperatures as follows

Power Derating Curves

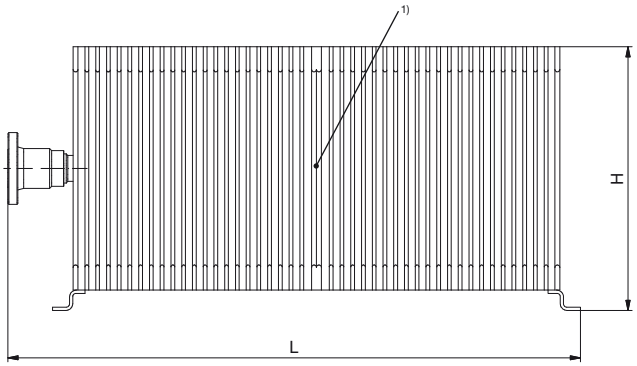


Data subject to change without notice – Edition E

1,6 kW ABSCHLUSSWIDERSTÄNDE
1.6 kW LOADS

- für Oberwellenmessung
- konvektionsgekühlt
- bleifrei
- kompakt
- für Innenraummontage

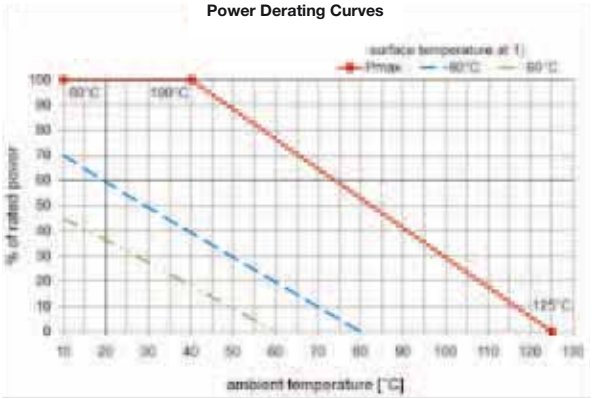
- for harmonic measurement
- convection-cooled
- lead-free
- compact
- for indoor application



Bestellnummer Part number	**BN 53 77 79**			
Frequenzbereich Frequency range	0 ≤ f ≤ 860 MHz	1452 ≤ f ≤ 1492 MHz	2904 ≤ f ≤ 2984 MHz	4356 ≤ f ≤ 4476 MHz
VSWR	≤ 1.15	≤ 1.10	≤ 1.90	≤ 1.90
Effektive Eingangsleistung Average input	≤ 1.6 kW 2)			
Prüfspannung Proof voltage	≤ 1.5 kV			
Anschlüsse Connectors	1 5/8" EIA			
Umgebungstemperatur Ambient temperature	-40 °C ≤ ϑ ≤ +40 °C 2)			
Abmessungen (L x B x H) mm Dimensions (L x B x H) mm	706 x 210 x 325			
Gewicht Weight	ca. 32 kg			
Einbaulage Operation position	Kühlrippen senkrecht Cooling fins vertically			

1) Messpunkt für Oberflächentemperatur, siehe Zeichnung
Measuring point for surface temperature, see drawing
2) Die Anschlussleistung reduziert sich bei steigender Umgebungstemperatur wie folgt
The maximum power handling is reduced with rising ambient temperatures as follows

Power Derating Curves

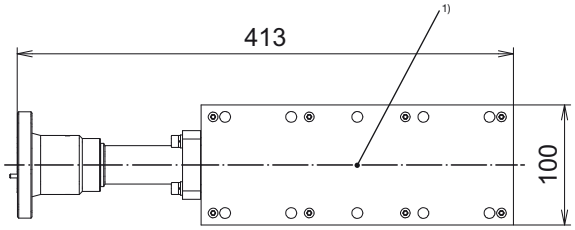


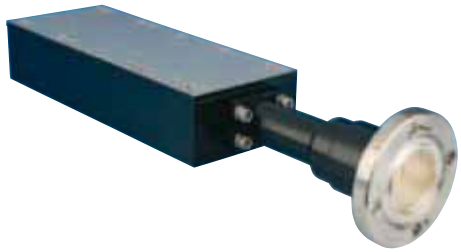
625 W, 1,25 kW, 2,5 kW ABSCHLUSSWIDERSTÄNDE

625 W, 1.25 kW, 2.5 kW LOADS

- ohne Kühlkörper
- zur Montage auf Kühlsysteme
- bleifrei
- kompakt
- für Innenraummontage

- without heat sink
- for installation on cooling systems
- lead-free
- compact
- for indoor application





Bestellnummer **Part number**	**BN 53 77 01**	**BN 53 77 02**	**BN 15 53 61**
Frequenzbereich Frequency range	0 ≤ f ≤ 860 MHz		
VSWR	≤ 1.06		≤ 1.10
Effektive Leistung Average power	≤ 625 W	≤ 1.25 kW	≤ 2.5 kW
Prüfspannung Proof voltage	≤ 2 kV		
Anschlüsse Connectors	7-16 Kuppler 7-16 female		1 5/8" EIA
Deckeltemperatur Temperature of cover	≤ 110 °C [1]		
Abmessungen (L x B x H) mm Dimensions (L x B x H) mm	202 x 33 x 66	232 x 33 x 80	413 x 54 x 100
Gewicht Weight	ca. 1 kg	ca. 1.2 kg	ca. 4.3 kg
Einbaulage Operation position	beliebig any		

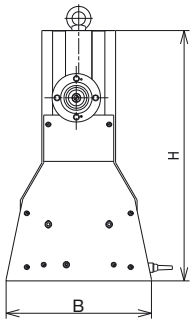
[1] Messpunkt für Oberflächentemperatur, siehe Zeichnung
Measuring point for surface temperature, see drawing
[1] Auf geeignetes Kühlsystem montieren, die Deckeltemperatur an Messpunkt 1) darf 110 °C nicht übersteigen
Mount on appropriate cooling, system, the surface temperature at measuring point 1) may not exceed 110 °C

Data subject to change without notice – Edition E

2,5 kW, 5 kW ABSCHLUSSWIDERSTÄNDE - AKTIV GEKÜHLT
2.5 kW, 5 kW LOADS - ACTIVE COOLED

- Zwangsluftkühlung
- bleifrei
- kompakt
- für Innenraummontage
- mit einem potentialfreien Interlock-Kontakt

- Forced air cooling
- lead-free
- compact
- for indoor application
- with an potential-free interlock contact

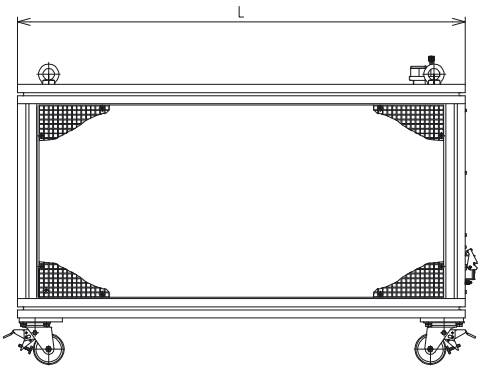


Bestellnummer **Part number**	**BN 53 42 87**	**BN 53 42 64**	**BN 53 42 65**
Frequenzbereich Frequency range	0 ≤ f ≤ 860 MHz		
VSWR	≤ 1.11		
Effektive Leistung Average power	≤ 2.5 kW	≤ 5 kW	
Prüfspannung Proof voltage	≤ 2.5 kV		
Anschlüsse Connectors	1 5/8" EIA		
Umgebungstemperatur Ambient temperature	-15 °C ≤ ϑ ≤ +45 °C		
Lagertemperatur Storage temperature	-30 °C ≤ ϑ ≤ +85 °C		
Abmessungen (L x B x H) mm Dimensions (L x B x H) mm	502 x 270 x 465	964 x 270 x 465	
Gewicht Weight	ca. 43 kg	ca. 60 kg	
Einbaulage Operation position	stehend (wie dargestellt) upright (as shown)		
Stromversorgung Power requirements	230V ± 10 %, 50/60Hz L,N,PE		
Leistungsaufnahme Power consumption	ca. 140 W	ca. 270 W	
Potentialfreier Interlock-Kontakt Potential-free interlock-contact	SELV acc. DIN EN 60950-1 max. 42.4 V ACpk / 60 V DC		
Schalldruckpegel Noise level	ca. 70 dB(A)		
Eingehaltene Normen Standards	EN 12100-1, EN 12100-2 EN 60950-1		
Zwangsluftkühlung Forced air cooling	permanent		Temeraturgesteuert temperature-controlled

10 kW, 20 kW, 30 kW ABSCHLUSSWIDERSTÄNDE
10 kW, 20 kW, 30 kW LOADS

- Flüssigkeits-Zwangsluft gekühlt
- bleifrei
- kompakt
- für Innenraummontage
- mit einem potentialfreien Interlock-Kontakt

- Liquid-Forced air cooling
- lead-free
- compact
- for indoor application
- with an potential free interlook contact



Bestellnummer **Part number**	**50 Hz mains** **60 Hz mains**	**BN 54 64 50** **BN 54 64 50 C0001**	**BN 54 64 60** _	**BN 54 64 70** **BN 54 64 70 C0001**
Frequenzbereich Frequency range		0 ≤ f ≤ 860 MHz		
VSWR	0 ≤ f ≤ 108 MHz 108 < f ≤ 470 MHz 470 < f ≤ 860 MHz 0 ≤ f ≤ 860 MHz	≤ 1.04 ≤ 1.04 ≤ 1.04 ≤ 1.08		
Effektive Eingangsleistung Average input		≤ 10 kW	≤ 20 kW	≤ 30 kW [1]
Prüfspannung Proof voltage		≤ 14 kV		
Anschlüsse Connectors		3 1/8" EIA [2]		
Umgebungstemperatur Ambient temperature		-15 °C ≤ ϑ ≤ +45 °C		
Lagertemperatur Storage temperature		-35 °C ≤ ϑ ≤ +85 °C		
Abmessungen (L x B x H) mm Dimensions (L x B x H) mm		760 x 540 x 789	1150 x 540 x 789	1150 x 660 x 789
Gewicht Weight		ca. 100 kg	ca. 110 kg	ca. 115 kg
Stromversorgung Power requirements		3~ +PE 400V ± 5 %, 50 Hz or 60 Hz depending on model		
Leistungsaufnahme Power consumtion		ca. 1.2 kW	ca. 1.4 kW	ca. 1.4 kW
Potentialfreier Interlock-Kontakt Potential-free interlock-contact		SELV acc. DIN EN 60950-1 max. 42.4 V ACpk / 60 V DC		
Schalldruckpegel Noise level		ca. 74 dB (A)		
Kühlmedium Coolant		SPINNER Kühlflüssigkeit SPINNER cooling liquid	Bestellung unter **BN 15 45 67** (25 l Kanister) Order with BN **15 45 67** (25 l canister)	

[1] Für ≥ 23 kW @ 470 - 860 MHz muss ein Übergang auf 4 1/2" EIA (339 IEC 50-105) verwendet werden.
Hierzu bitte Übergang **BN 71 50 00** und Kupplungselement **BN 91 87 10** seperat bestellen
For ≥ 23 kW @ 470 - 860 MHz an adapter to 4 1/2" EIA (339 IEC 50-105) must be used.
Please order separately adapter **BN 71 50 00** and coupling element **BN 91 87 10**

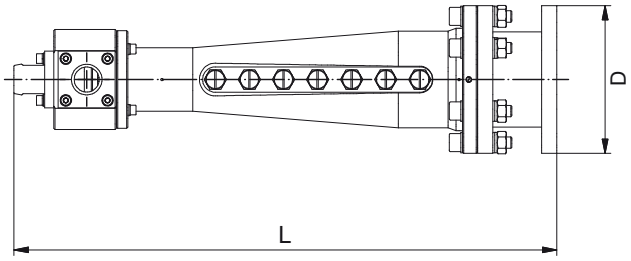
[2] Bitte beachten: 3 1/8" Flansch hat Gewinde M10 (keine Bohrung Ø 10,6 mm), Kurzübergange mit Stehbolzen können nicht verwendet werden
Please note: 3 1/8" flange with thread M10 (no drill hole Ø 10.6 mm), short adaptors with stay bolts cannot be used

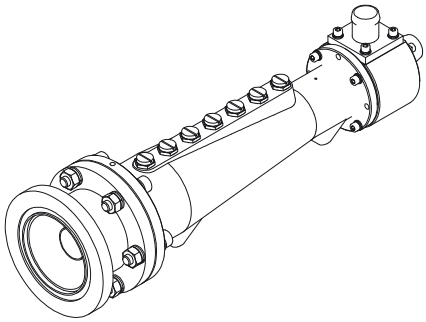
Data subject to change without notice – Edition E

38 kW ABSCHLUSSWIDERSTÄNDE
38 kW LOADS

- Flüssigkeitsgekühlt
- bleifrei
- kompakt
- für Innenraummontage
- BeO frei

- Liquid cooling
- lead-free
- compact
- for indoor application
- BeO free



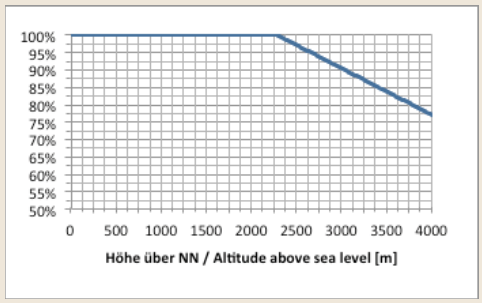
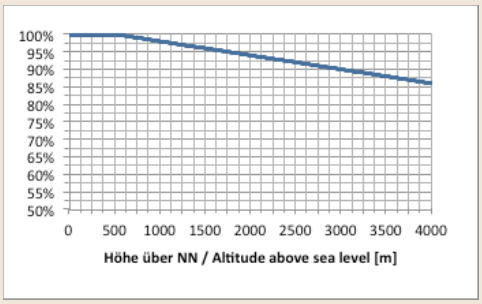
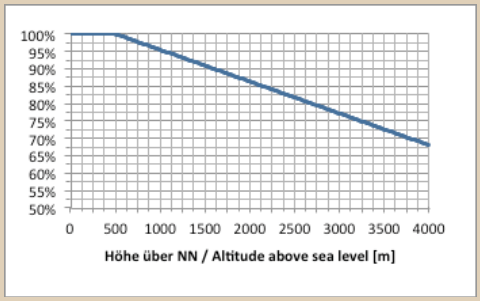


Bestellnummer Part number		**BN 10 73 25**	**BN 54 64 00**
Frequenzbereich Frequency range		0 ≤ f ≤ 860 MHz	
VSWR	0 ≤ f ≤ 108 MHz 108 ≤ f ≤ 470 MHz 470 ≤ f ≤ 860 MHz 0 ≤ f ≤ 860 MHz	≤ 1.04 ≤ 1.04 ≤ 1.04 ≤ 1.08	
Effektive Eingangsleistung Average input		≤ 38 kW [1]	≤ 45 kW
Prüfspannung Proof voltage		≤ 14 kV	≤ 20 kV
Anschlüsse Connectors		3 1/8" EIA (max. 23 kW @ 860 MHz)	6 1/8" EIA
Eintrittstemperatur Input temperature of coolant		max. 45 °C	
Kühlmedium Coolant		SPINNER Kühlflüssigkeit SPINNER cooling liquid	Bestellung unter **BN 15 45 67** (25 l Kanister) Order with BN **15 45 67** (25 l canister)
Kühlflüssigkeitsdurchfluss Coolant flow rate		≥ 55 l/min	≥ 60 l/min
Kühlflüssigkeitsanschlüsse Coolant connections		Stutzen für Schlauch 1" lichte Weite Hoze nozzle for hose with 1" inner diameter	
Abmessungen (L x D) mm Dimensions (L x D) mm		3 1/8" EIA 477.8 x 130	6 1/8" EIA 543.5 x 206.5
Gewicht Weight		3 1/8" EIA ca. 7.5 kg	ca. 11.5 kg

[1] für ≥ 23 kW @ 470 - 860 MHz muss ein Übergang auf 4 1/2" EIA (339 IEC 50-105) verwendet werden, bitte **BN 71 50 10** seperat bestellen
for ≥ 23 kW @ 470 - 860 MHz an adapter to 4 1/2" EIA (339 IEC 50-105) must be used, please order separately **BN 71 50 10**

ENVIRONMENTAL CONDITIONS FOR BROADCAST PRODUCTS

The environmental conditions for broadcast products are applicable if not stated otherwise at the individual product page.

Products	**Combiners, Filters**	**Patch Panels, Switches, Coaxial Rigid Lines Components**
Operational conditions	ETSI EN 300 019-1-3 V2.3.2 (2009-1) class 3.1 N	
Ambient temperature	-10 °C ≤ ϑ ≤ +45 °C	
Condensation	not allowed	
Relative humidity	≤ 95%	
Derating of input power with increasing altitude	 The maximum input power can be applied up to 2286 m or 7500 ft above sea level unless noted otherwise in the data sheet. Above this height the maximum input power must be reduced as shown in the diagram.	 The maximum input power can be applied up to 500 m or 1600 ft above sea level unless noted otherwise in the data sheet. Above this height the maximum input power must be reduced as shown in the diagram.
Derating of voltage with increasing altitude	included in the derating of input power	 The maximum voltage can be applied up to 500 m or 1600 ft above sea level unless noted otherwise in the data sheet. Above this height the voltage must be reduced as shown in the diagram.
Transport conditions	ETSI EN 300 019-1-2 V2.1.4 (2003-04) class 2.2	
Ambient temperature	-25 °C ≤ ϑ ≤ +70 °C	
Rain, condensation, icing	not allowed	
Storage conditions	ETSI EN 300 019-1-1 V2.1.4 (2003-04) class 1.2	
Ambient temperature	-10 °C ≤ ϑ ≤ +45 °C	
Rain, condensation, icing	not allowed	
Safety	EN 60215 (1994) / IEC 215 (1993)	

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Data subject to change without notice – Edition E

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Data subject to change without notice – Edition E

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NOTES

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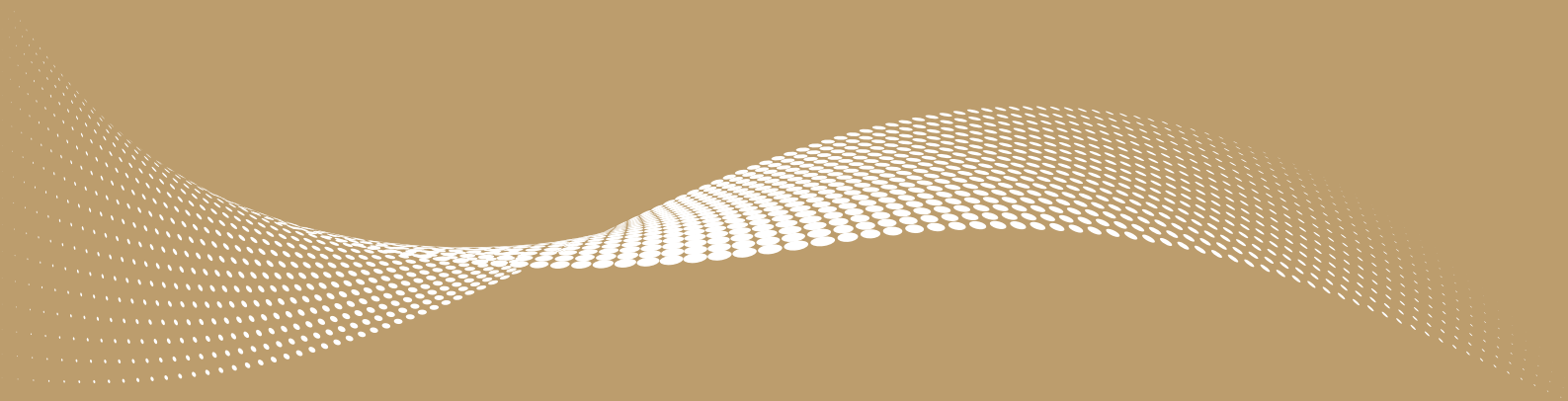

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