



# **Filter Configurations**

**for High Resolution NMR  
(and HR MAS)**

**Version 004**

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**Bruker BioSpin**

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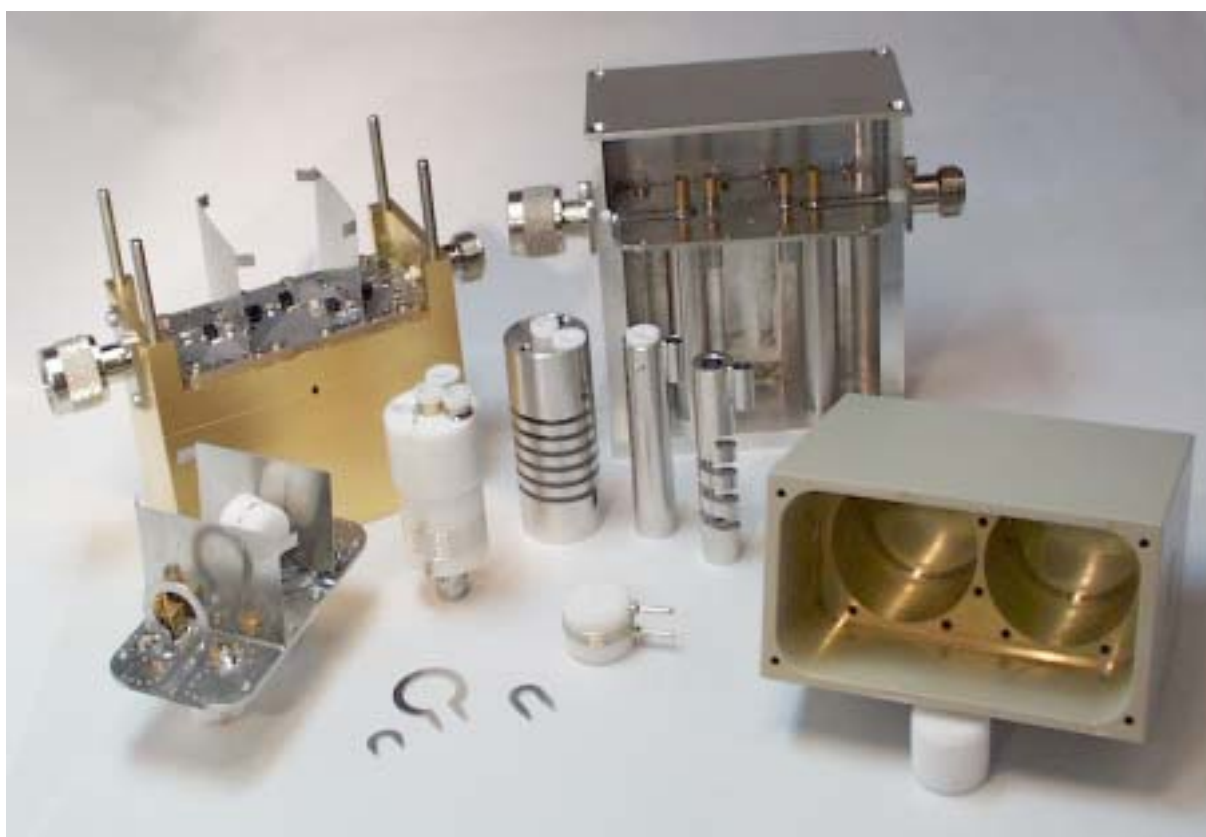
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# Filter Configurations for HR NMR and HR MAS

# 1

Figure 1.1. High Resolution NMR Filters and Filtercomponents



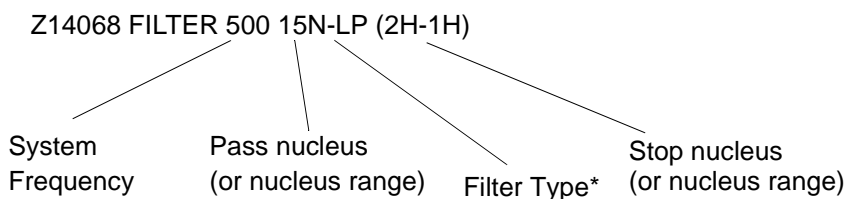
## Introduction

1.1

- The following chapter helps to select the necessary filter type dependent on the preamplifier and the probe.
- System orders with multiple probes require only the combined minimum set of filters.

## Filter Configurations for HR NMR and HR MAS

- Only standard operation is guaranteed with the recommended filter configuration. Non-standard operation (observe on outer coil and decoupling on inner coil) may also be possible with the recommended filter configuration.
- With individual probe orders the current configuration at the customer's labs should be obtained to avoid ordering filters which are already at the site.
- If your probe is not included in this list, please fill in the filter requirements questionnaire on **page 10** and send it to BBIO-CH, Production Department.
- The exact order number for the corresponding magnet frequency can be taken from the chapter "**Available Filters (July 2002)**" on **page 47**.
- No additional filters are necessary in the lock channel.
- No additional filters are necessary for HPPR CRP 15N and 13C modules.
- No additional filters are necessary for HPPR/2 15N and 13C modules.
- For HR MAS are exactly the same filters required as for high resolution NMR (for the corresponding probe).
- All filters should be mounted on the HPPR and not on the probe
- In cause of more than one filter, the 2H stop should be mounted closer to the HPPR
- Explanation of the filter nomenclature:







\*) LP=low pass, HP= high pass, BP=band pass

- For use of outfaced filters (not mentioned in Table **page 47**) see previous manual versions (Z31430 Index 1 or 2).









Table 1.1. Currently used preamplifiers for 1H (HR)

Preamplifier	
HPPR 1H PREAMP MODULE 200-400	
HPPR/2 1H LNA MODULE 500-900	
AQS 1H2H PREAMP 300-400 <sup>a</sup>	
HPPR/2 1H2H MODULE 300-400 <sup>a</sup>	

a coming soon

Table 1.2. Currently used preamplifiers for X (HR)

Preamplifier	
HPPR X-BB19F 2HS MODULE 200-250	
HPPR X-BB19F 2HP MODULE 300-400	
HPPR/2 XBB19F 2HS MODULE 500-700	
HPPR/2 XBB31P 2HS MODULE 750-900	
AQS XBB19F 2HS PREAMP 300-400 <sup>a</sup>	
HPPR/2 XBB19F 2HS MODULE 300-400 <sup>a</sup>	

a coming soon

# Filter Configurations for HR NMR and HR MAS

## Filter Requirements Questionnaire

1.2

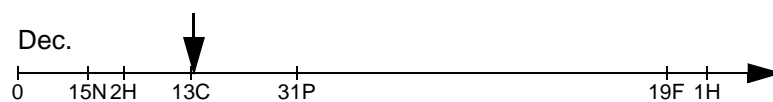
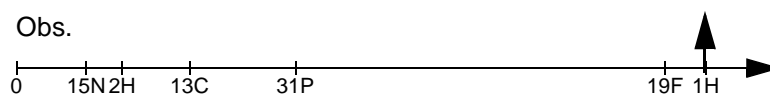
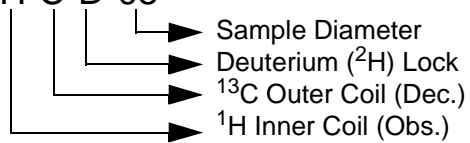
Please fill in the following questionnaire for each probe.

(Part. Nr. / Ser. Nr.)

Bruker Order Number		
Spectrometer Type		
Probe		
Transmitter Configuration	1H	
	19F	
	X	
	Y	
	Z	
HPPR Configuration	1H	
	19F	
	XBB	
	...	
Lock	2H	
	19F	
	2H Lockswitch	
Existing Filter 1		
Existing Filter 2		
...		
Experiment 1	Obs1 {Dec1}	
Experiment 2	Obs2 {Dec2}	
...		

**Example:**















PH SEI H-C-D-05



# Filter Configurations for HR NMR and HR MAS

















## Required Filters:

Table 1.3. Required Filters for PH SEI H-C-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	0-31P-LP (19F-3H) 
	HPPR X-BB19F 2HP MODULE 300-400 	0-31P-LP (19F-3H)  2H Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-

13C Observe/ 1H Decoupling might be possible with this configuration.

Table 1.4. Required Filters for PH SEI H-F-D

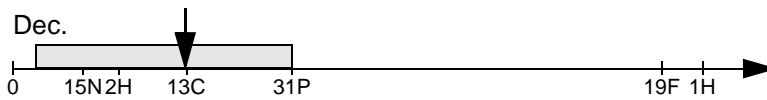
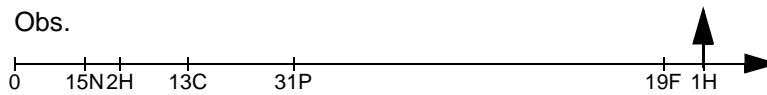
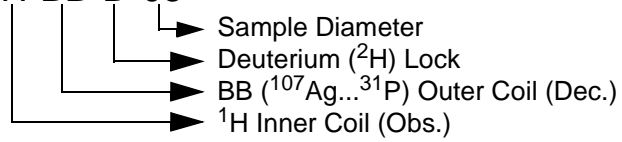
Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	1H-PASS / 19-F STOP 
	HPPR/2 1H LNA MODULE 500-900 	1H-PASS / 19-F STOP 
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	0-31P,19F-LP (1H) 
	HPPR X-BB19F 2HP MODULE 300-400 	2H Stop  0-31P,19F-LP (1H) 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P,19F-LP (1H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	not possible
	AQS XBB19F 2HS PREAMP 300-400 	- <sup>a</sup>
	HPPR/2 XBB19F 2HS MODULE 300-400 	-

a only for ECL<=1: Filter 0-31P,19F-LP(1H) is required for 19F Observe and 1H Decoupling

19F Observe/1H Decoupling might be possible with this configuration.
















**Example:**

PH BBI H-BB-D-05



**Required Filters:**

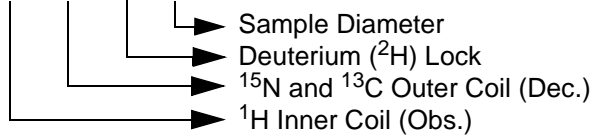
Table 1.5. Required Filters for PH BBI H-BB-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Pre-amplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
	HPPR 1H PREAMP MODULE 200-400 	-
Decoupling Path X-BB Pre-amplifier	HPPR X-BB19F 2HS MODULE 200-250 	0-31P-LP (19F-3H) 
	HPPR X-BB19F 2HP MODULE 300-400 	0-31P-LP (19F-3H)  2H Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-

X Observe/ 1H Decoupling might be possible with this configuration.

**Example:**





















PH TXI H-C/N-D-05





**Required Filters:**

Table 1.6. Required Filters for PH TXI H-C/N-D
































Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path X-BB Preamplifier 13C	HPPR X-BB19F 2HS MODULE 200-250 	0-31P-LP (19F-3H)  13C-Pass / 2H-Stop 
	HPPR X-BB19F 2HP MODULE 300-400 	0-31P-LP (19F-3H)  13C-Pass / 2H-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P-LP (19F-3H)  13C-Pass / 2H-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-900 	13C-Pass / 2H-Stop 
	AQS XBB19F 2HS PREAMP 300-400 	13C-Pass / 2H-Stop 
	HPPR/2 XBB19F 2HS MODULE 300-400 	13C-Pass / 2H-Stop 
Decoupling Path 15N	-no Preamplifier or some X Preamplifier	15N-Pass / 2H-Stop 

13C Observe/ 1H Decoupling might be possible with this configuration.

For 15N Observe the X-BB Preamplifier must be plugged in the 15N channel.

# Filter Configurations for HR NMR and HR MAS

Table 1.7. Required Filters for PH TXI H-C/P-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path X-BB Preamplifier 13C	HPPR X-BB19F 2HS MODULE 200-250 	13C-Pass / 31P-Stop 
	HPPR X-BB19F 2HP MODULE 300-400 	13C-Pass / 31P-Stop  13C-Pass / 2H-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	13C-Pass / 31P-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-900 	13C-Pass / 31P-Stop 
	AQS XBB19F 2HS PREAMP 300-400 	13C-Pass / 31P-Stop 
	HPPR/2 XBB19F 2HS MODULE 300-400 	13C-Pass / 31P-Stop 
Decoupling Path 31P	no Preamplifier	0-31P-LP (19F-3H)  31-P-Pass / 2H-Stop 
	HPPR X-BB19F 2HS MODULE 200-250 	31-P-Pass / 13C-Stop 
	HPPR X-BB19F 2HP MODULE 300-400 	31-P-Pass / 2H-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	31-P-Pass / 13C-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-900 	31-P-Pass / 13C-Stop 
	AQS XBB19F 2HS PREAMP 300-400 	31-P-Pass / 13C-Stop 
	HPPR/2 XBB19F 2HS MODULE 300-400 	31-P-Pass / 13C-Stop 

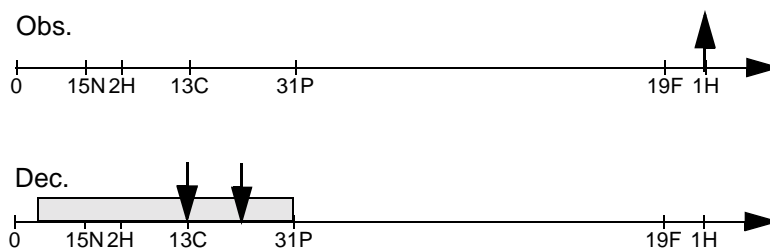
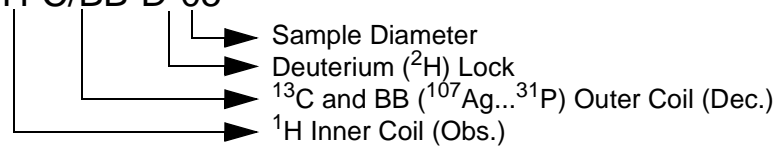
13C Observe/ 1H Decoupling might be possible with this configuration.  
For 31P Observe the X-BB Preamplifier must be plugged in the 31P channel.

## TBI (Triple Broad Band Inverse)

1.6

**Example:**











PH TBI H-C/BB-D-05



# Filter Configurations for HR NMR and HR MAS

## Required Filters:

Table 1.8. Required Filters for PH TBI H-C/BB-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path X-BB Preamplifier 13C	HPPR X-BB19F 2HS MODULE 200-250 	a b
	HPPR X-BB19F 2HP MODULE 300-400 	a b
	HPPR/2 XBB19F 2HS MODULE 500-700 	a b
	HPPR/2 XBB31P 2HS MODULE 750-900 	a b
	AQS XBB19F 2HS PREAMP 300-400 	a b
	HPPR/2 XBB19F 2HS MODULE 300-400 	a b
Decoupling Path BB	-no Preamplifier or some X Preamplifier	a b

a For 13C and 15N decoupling filter requirements is the same as ["Required Filters for PH TXI H-C/N-D" on page 17](#)

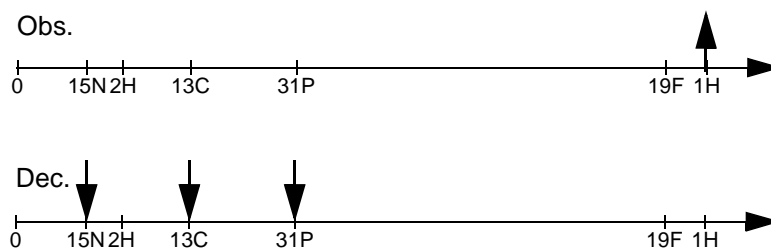
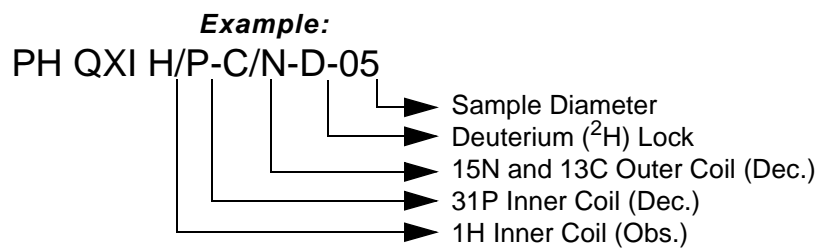
b For 13C and 31P decoupling filter requirements is the same as ["Required Filters for PH TXI H-C/P-D" on page 18](#)

For additional decoupling nuclei please contact the nearest local Bruker office.

13C Observe/ 1H Decoupling might be possible with this configuration.

QXI (Quattro X-Nuclei Inverse)



















1.7



# Filter Configurations for HR NMR and HR MAS

## Required Filters:

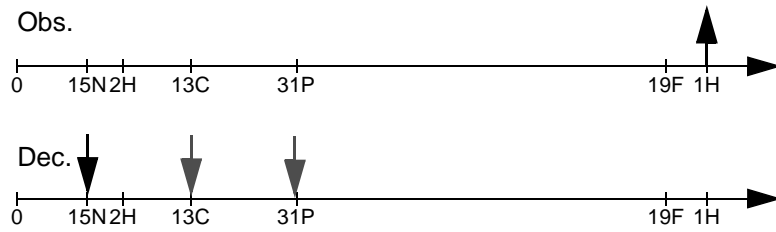
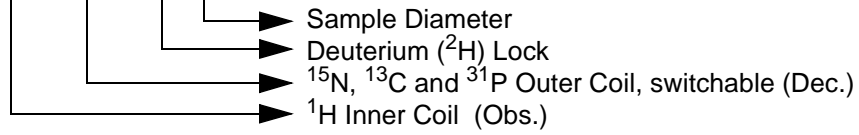
Table 1.9. Required Filters for PH QXI H/P-C/N-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path X-BB Preamplifier 13C	HPPR X-BB19F 2HS MODULE 200-250 	13C-BP (0-SI,11B-H) 
	HPPR X-BB19F 2HP MODULE 300-400 	13C-BP (0-SI,11B-H) 
	HPPR/2 XBB19F 2HS MODULE 500-700 	13C-BP (0-SI,11B-H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	13C-BP (0-SI,11B-H) 
	AQS XBB19F 2HS PREAMP 300-400 	13C-BP (0-SI,11B-H) 
	HPPR/2 XBB19F 2HS MODULE 300-400 	13C-BP (0-SI,11B-H) 
Decoupling Path 15N	no Preamplifier or some X Preamplifier	15N-Pass / 2H-Stop 
Decoupling Path 31P	no Preamplifier or some X Preamplifier	31P-BP(0-11B,19F-H) 

13C Observe/ 1H Decoupling might be possible with this configuration.

**Example:**















PH QNI H-P/C/N-D-05



# Filter Configurations for HR NMR and HR MAS

## Required Filters:

















Table 1.10. Required Filters for PH QNI H-P/C/N-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	0-31P-LP (19F-3H) 
	HPPR X-BB19F 2HP MODULE 300-400 	0-31P-LP (19F-3H)  2H-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-

X Observe / 1H Decoupling might be possible with this configuration.



*Table 1.11. Required Filters for PH QNI H-F/P/C -D*

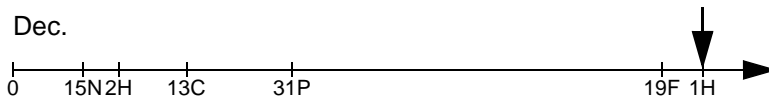
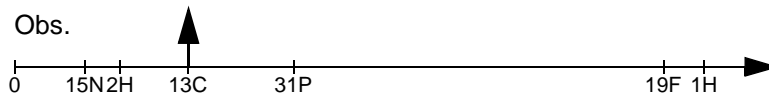
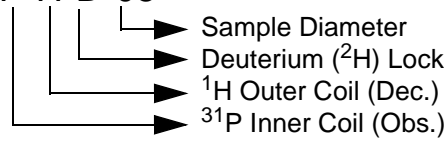
Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	1H-Pass / 19F-Stop 
	HPPR/2 1H LNA MODULE 500-900 	1H-Pass / 19F-Stop 
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	0-31P,19F-LP (1H) 
	HPPR X-BB19F 2HP MODULE 300-400 	0-31P,19F-LP (1H)  2H-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P,19F-LP (1H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	19F decoupling not possible
	AQS XBB19F 2HS PREAMP 300-400 	- <sup>a</sup>
	HPPR/2 XBB19F 2HS MODULE 300-400 	-

a only for ECL <=1 and 19F(1H) Experiment, Filter 0-31P,19F-LP(1H) is required

X Observe / 1H Decoupling might be possible with this configuration.















*Example:*

PH SEX P-H-D-05



**Required Filters:**













Table 1.12. Required Filters for PH SEX C-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier 13C	HPPR X-BB19F 2HS MODULE 200-250 	0-31P-LP (19F-3H) 
	HPPR X-BB19F 2HP MODULE 300-400 	0-31P-LP (19F-3H)  2H-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-

1H Observe / 13C Decoupling might be possible with this configuration.










## Filter Configurations for HR NMR and HR MAS

Table 1.13. Required Filters for PH SEX 3H-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 3H Preamplifier	HPPR 3H PREAMP MODULE 250-400 	3H-HP(1H) 
	HPPR/2 3H MODULE 	3H-HP(1H) 
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	1H-LP(3H) 
	HPPR/2 1H LNA MODULE 500-900 	1H-LP(3H) 
	AQS 1H2H PREAMP 300-400 	1H-LP(3H) 
	HPPR/2 1H2H MODULE 300-400 	1H-LP(3H) 












1H Observe/ 3H Decoupling might be possible with this configuration.

Table 1.14. Required Filters for PH SEX 2H-H-F

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 2H Preamplifier	HPPR 2H PREAMP MODULE 200-400 	-
	HPPR/2 2H MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	1H-Pass / 19F-Stop 
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-

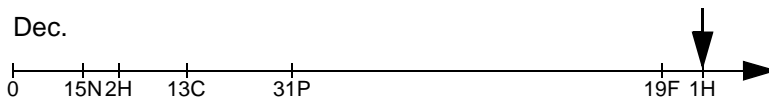
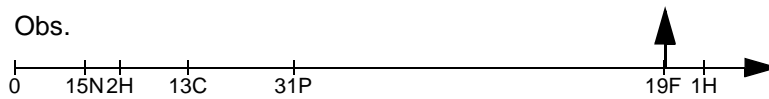
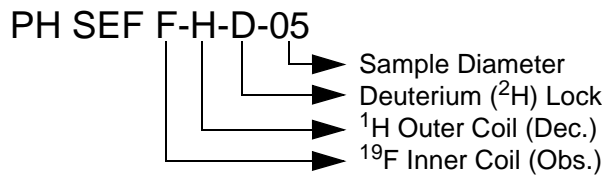
1H Observe/ 2H Decoupling might be possible with this configuration.

Table 1.15. Filters for PH SEX X-H-D (x=all X-nuclei except 2H, 3H, 13C)

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	-
	HPPR X-BB19F 2HP MODULE 300-400 	2H-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	-
	HPPR/2 XBB31P 2HS MODULE 750-900 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-




















1H Observe / X Decoupling might be possible with this configuration.

*Example:*



**Required Filters:**

Table 1.16. Required Filters for PH SEF F-H-D

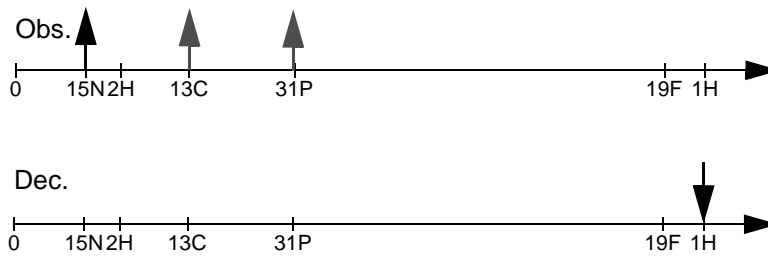
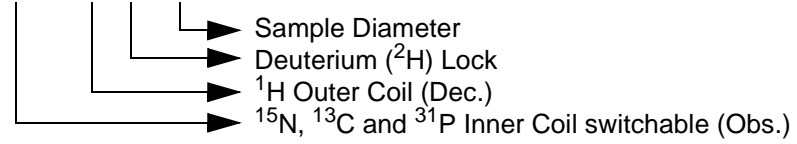
Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 19F Preamplifier	HPPR 19F PREAMP MODULE 	0-31P,19F-LP (1H) 
	HPPR/2 19F MODULE 	0-31P,19F-LP (1H) 
	HPPR X-BB19F 2HS MODULE 200-250 	0-31P,19F-LP (1H) 
	HPPR X-BB19F 2HP MODULE 300-400 	0-31P,19F-LP (1H)  2H-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P,19F-LP (1H) 
	AQS XBB19F 2HS PREAMP 300-400 	- <sup>a</sup>
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	1H-PASS /19F-STOP 
	HPPR/2 1H LNA MODULE 500-900 	1H-PASS /19F-STOP 
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-

<sup>a</sup> only for ECL <=1 Filter 0-31P,19F-LP(1H) is required

1H Observe / 19F Decoupling might be possible with this configuration.

*Example:*














PH QNP P/C/N-H-D-05





**Required Filters:**




















Table 1.17. Required Filters for PH QNP P/C/N-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	0-31P-LP (19F-3H) 
	HPPR X-BB19F 2HP MODULE 300-400 	2H-Stop 0-31P-LP (19F-3H) 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-

1H Observe / X Decoupling might be possible with this configuration.

# Filter Configurations for HR NMR and HR MAS

Table 1.18. Required Filters for PH QNP F/P/C -H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	0-31P,19F-LP (1H)  0-31P-LP (19F-3H) <sup>a</sup> 
	HPPR X-BB19F 2HP MODULE 300-400 	2H-Stop  0-31P,19F-LP (1H)  0-31P-LP (19F-3H) <sup>a</sup> 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P,19F-LP (1H)  0-31P-LP (19F-3H) <sup>a</sup> 
	HPPR/2 XBB31P 2HS MODULE 750-900 	19F observe not possible
	AQS XBB19F 2HS PREAMP 300-400 	_b
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	1H-Pass / 19F-Stop 
	HPPR/2 1H LNA MODULE 500-900 	1H-Pass / 19F-Stop 
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-

a This filter is only necessary for <sup>13</sup>C decoupling and must be removed for <sup>19</sup>F decoupling or observe

b only for ECL <=1 Filter 0-31P,19F-LP(1H) is required

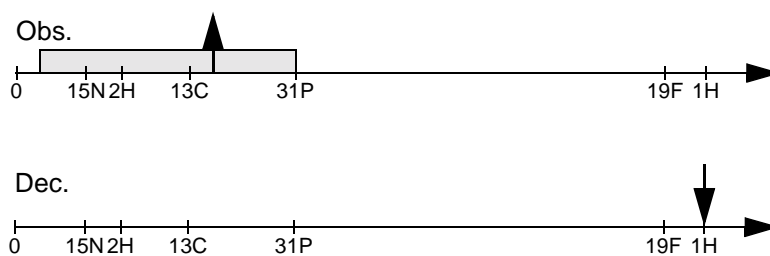
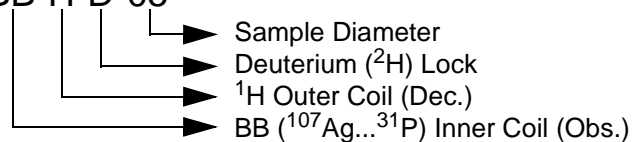
1H Observe / X Decoupling might be possible with this configuration.

**BBO (Broad Band Observe)**

1.12

**Example:**




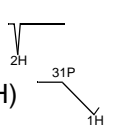









PH BBO BB-H-D-05



# Filter Configurations for HR NMR and HR MAS

## Required Filters:

Table 1.19. Required Filters for PH BBO BB-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	0-31P-LP (19F-3H) 
	HPPR X-BB19F 2HP MODULE 300-400 	2H-Stop 0-31P-LP (19F-3H) 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-

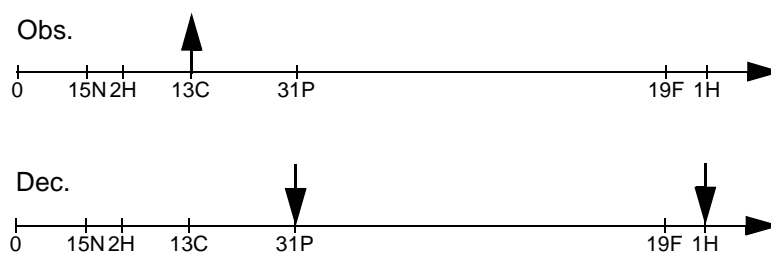
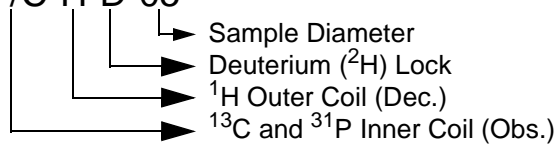
1H Observe / X Decoupling might be possible with this configuration.

## TXO (Triple X-Nuclei Observe)

1.13

**Example:**




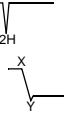












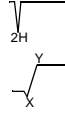



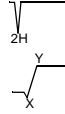








PH TXO P/C-H-D-05


































# Filter Configurations for HR NMR and HR MAS

## Required Filters:

Table 1.20. Required Filters for PH TXO X/Y-H-D (without 19F)

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	X-Pass / Y-Stop 
	HPPR X-BB19F 2HP MODULE 300-400 	2H-Stop X-Pass / Y-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	X-Pass / Y-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-900 	X-Pass / Y-Stop 
	AQS XBB19F 2HS PREAMP 300-400 	X-Pass / Y-Stop 
	HPPR/2 XBB19F 2HS MODULE 300-400 	X-Pass / Y-Stop 
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path Y	-no Preamplifier	2H Stop Y-Pass / X-Stop 
	HPPR X-BB19F 2HS MODULE 200-250 	Y-Pass / X-Stop 
	HPPR X-BB19F 2HP MODULE 300-400 	2H Stop Y-Pass / X-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	Y-Pass / X-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-900 	Y-Pass / X-Stop 
	AQS XBB19F 2HS PREAMP 300-400 	Y-Pass / X-Stop 
	HPPR/2 XBB19F 2HS MODULE 300-400 	Y-Pass / X-Stop 

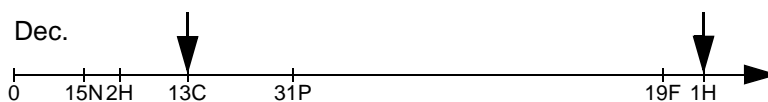
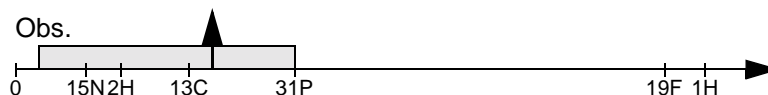
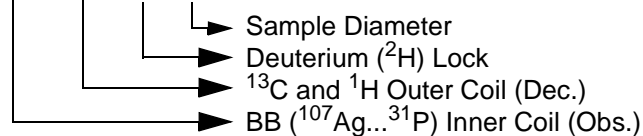
*Table 1.21. Required Filters for PH TXO F/Y-H-D (with X=19F)*

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	19F Bandpass 
	HPPR X-BB19F 2HP MODULE 300-400 	19F Bandpass 
	HPPR/2 XBB19F 2HS MODULE 500-700 	19F Bandpass 
	HPPR/2 XBB31P 2HS MODULE 750-900 	-not possible
	AQS XBB19F 2HS PREAMP 300-400 	19F Bandpass 
	HPPR/2 XBB19F 2HS MODULE 300-400 	19F Bandpass 
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	1H-Pass / 19F-Stop 
	HPPR/2 1H LNA MODULE 500-900 	1H-Pass / 19F-Stop 
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path Y	no Preamplifier	2H-Stop  0-31P-LP (19F-3H) 
	HPPR X-BB19F 2HS MODULE 200-250 	0-31P-LP (19F-3H) 
	HPPR X-BB19F 2HP MODULE 300-400 	2H-Stop  0-31P-LP (19F-3H) 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	-
	AQS XBB19F 2HS PREAMP 300-400 	0-31P-LP (19F-3H) 
	HPPR/2 XBB19F 2HS MODULE 300-400 	0-31P-LP (19F-3H) 

Y Observe, 19F and 1H Decoupling might be possible with this configuration.

**Example:**

PH TBO BB-H/C-D-05



**Required Filters:**

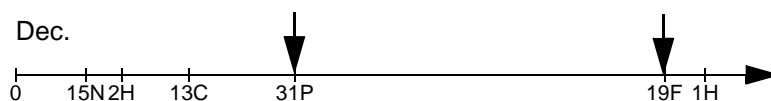
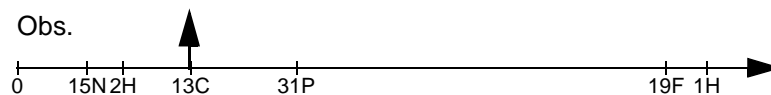
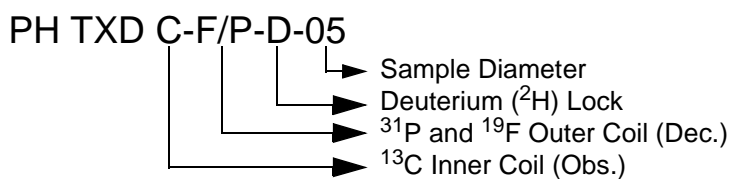
Please contact the nearest Bruker head office for TBO filter requirements.



TXD (Triple X-Nuclei Double Decoupling)

1.15

































**Example:**



# Filter Configurations for HR NMR and HR MAS





























## Required Filters:

Table 1.22. Required Filters for PH TXD X-H/Y-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	X-Pass / Y-Stop 
	HPPR X-BB19F 2HP MODULE 300-400 	2H-Stop  X-Pass / Y-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	X-Pass / Y-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-900 	X-Pass / Y-Stop 
	AQS XBB19F 2HS PREAMP 300-400 	X-Pass / Y-Stop 
	HPPR/2 XBB19F 2HS MODULE 300-400 	X-Pass / Y-Stop 
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path Y	no Preamplifier	2H Stop  Y-Pass / X-Stop 
	HPPR X-BB19F 2HS MODULE 200-250 	Y-Pass / X-Stop 
	HPPR X-BB19F 2HP MODULE 300-400 	2H Stop  Y-Pass / X-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	Y-Pass / X-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-900 	Y-Pass / X-Stop 
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	HPPR/2 XBB19F 2HS MODULE 300-400 	Y-Pass / X-Stop 


















## TXD (Triple X-Nuclei Double Decoupling)

Table 1.23. Required Filters for PH TXD X-F/Z-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	X-Pass / Y-Stop 
	HPPR X-BB19F 2HP MODULE 300-400 	2H-Stop  X-Pass / Y-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	X-Pass / Y-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-900 	X-Pass / Y-Stop 
	AQS XBB19F 2HS PREAMP 300-400 	X-Pass / Y-Stop 
	HPPR/2 XBB19F 2HS MODULE 300-400 	X-Pass / Y-Stop 
Decoupling Path Y (19F)	no preamplifier or some X preamplifier	19F Bandpass 
Decoupling Path Z	no preamplifier	2H Stop  Z-Pass / X-Stop 
	HPPR X-BB19F 2HS MODULE 200-250 	Z-Pass / X-Stop 
	HPPR X-BB19F 2HP MODULE 300-400 	Z-Pass / X-Stop 
	HPPR/2 XBB19F 2HS MODULE 500-700 	Z-Pass / X-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-900 	Z-Pass / X-Stop 
	AQS XBB19F 2HS PREAMP 300-400 	Z-Pass / X-Stop 
	HPPR/2 XBB19F 2HS MODULE 300-400 	Z-Pass / X-Stop 

# Filter Configurations for HR NMR and HR MAS

Table 1.24. Required Filters for PH TXD X-H/F-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR X-BB19F 2HS MODULE 200-250 	0-31P-LP (19F-3H) 
	HPPR X-BB19F 2HP MODULE 300-400 	2H-Stop  0-31P-LP (19F-3H) 
	HPPR/2 XBB19F 2HS MODULE 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-900 	-
	AQS XBB19F 2HS PREAMP 300-400 	0-31P-LP (19F-3H) 
	HPPR/2 XBB19F 2HS MODULE 300-400 	0-31P-LP (19F-3H) 
Decoupling Path 1H Preamplifier	HPPR 1H PREAMP MODULE 200-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path y (19F)	no preamplifier or some X preamplifier	19F Bandpass 

# *Filter Configurations for CP MAS*

# 2

## *Introduction*

2.1

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CP MAS filters will not be any longer supplied from BBIO-CH. For part numbers of all CP MAS filters please consult manual Z31481 (Power Filter) or contact BBIO-FR.



# *Available Filters (July 2002)*

# 3

Z00113 FILTER 100 2H STOP  
Z14345 FILTER 100 0-31P,19F-LP (1H)  
Z6603 FILTER 100 LOW PASS 1H STOP

-----  
Z13281 FILTER 200 1H-PASS / 19F-STOP  
Z00106 FILTER 200 2H PASS  
Z00114 FILTER 200 2H STOP  
Z13742 FILTER 200 2H-PASS / 13C-STOP  
Z13327 FILTER 200 0-31P,19F-LP (1H)  
Z14329 FILTER 200 0-31P-LP (19F-3H)  
Z13088 FILTER 200 11B-PASS / 13C-STOP  
Z41000 FILTER 200 11B-PASS / 31P-STOP  
Z13087 FILTER 200 13C-PASS / 11B-STOP  
Z13739 FILTER 200 13C-PASS / 15N-STOP  
Z13083 FILTER 200 13C-PASS / 2H-STOP  
Z6842 FILTER 200 13C-PASS / 31P-STOP  
Z13740 FILTER 200 13C-PASS /29SI-STOP  
Z13741 FILTER 200 15N-PASS / 13C-STOP  
Z13908 FILTER 200 19F-BANDPASS  
Z12967 FILTER 200 23NA-PASS /31P-STOP  
Z13015 FILTER 200 27AL-PASS /31P-STOP  
Z13744 FILTER 200 29SI-PASS /11B-STOP  
Z13743 FILTER 200 29SI-PASS /13C-STOP  
Z41001 FILTER 200 31P-PASS / 11B-STOP  
Z6843 FILTER 200 31P-PASS / 13C-STOP  
Z12968 FILTER 200 31P-PASS /23NA-STOP  
Z13111 FILTER 200 LDA/4-TRAFO 13C/31P

-----  
Z13279 FILTER 250 1H-PASS / 19F-STOP  
Z00107 FILTER 250 2H PASS  
Z00115 FILTER 250 2H STOP

## Available Filters (July 2002)

Z13439 FILTER 250 3H-PASS / 1H-STOP  
Z13328 FILTER 250 0-31P,19F-LP (1H)  
Z14330 FILTER 250 0-31P-LP (19F-3H)  
Z12810 FILTER 250 103RH-PASS/31P-STOP  
Z13894 FILTER 250 117SN-PASS/13C-STOP  
Z13892 FILTER 250 117SN-PASS/31P-STOP  
Z9146 FILTER 250 13C-PASS / 2H-STOP  
Z6818 FILTER 250 13C-PASS / 31P-STOP  
Z13893 FILTER 250 13C-PASS/117SN-STOP  
Z13375 FILTER 250 14N-PASS/195PT-STOP  
Z42386 FILTER 250 15N-PASS / 2H-STOP  
Z13376 FILTER 250 195PT-PASS/14N-STOP  
Z13902 FILTER 250 19F-BANDPASS  
Z9774 FILTER 250 205TL-PASS/ 1H-STOP  
Z6819 FILTER 250 31P-PASS / 13C-STOP  
Z12811 FILTER 2531P-PASS/103RH-STOP  
Z13891 FILTER 250 31P-PASS/117SN-STOP

-----  
Z13270 FILTER 300 1H-PASS / 19F-STOP  
Z13763 FILTER 300 1H-LP(3H)  
Z00108 FILTER 300 2H PASS  
Z00116 FILTER 300 2H STOP  
Z9327 FILTER 300 2H-PASS / 13C-STOP  
Z9330 FILTER 300 2H-PASS / 15N-STOP  
Z7781 FILTER 300 2H-PASS / 19F-STOP  
Z13764 FILTER 300 3H-PASS / 1H-STOP  
Z13329 FILTER 300 0-31P,19F-LP (1H)  
Z14331 FILTER 300 0-31P-LP (19F-3H)  
Z13029 FILTER 300 119SN-P 13C-29SI-ST  
Z8742 FILTER 300 119SN-PASS/31P-STOP  
Z9229 FILTER 300 11B-PASS / 31P-STOP  
Z13972 FILTER 300 13C-BP (0-2H,P-H)  
Z9328 FILTER 300 13C-PASS / 2H-STOP  
Z12853 FILTER 300 13C-PASS / 14N-STOP  
Z8955 FILTER 300 13C-PASS / 15N-STOP  
Z6845 FILTER 300 13C-PASS / 31P-STOP  
Z9329 FILTER 300 15N-PASS / 2H-STOP



Z8954 FILTER 300 15N-PASS / 13C-STOP  
Z7780 FILTER 300 15N-PASS / 6LI-STOP  
Z13773 FILTER 300 19F-BANDPASS  
Z42428 FILTER 300 27A-PASS / 31P-STOP  
Z15174 FILTER 300 31P BP(0-11B,19F-H)  
Z9228 FILTER 300 31P-PASS / 11B-STOP  
Z6844 FILTER 300 31P-PASS / 13C-STOP  
Z42427 FILTER 300 31P-PASS / 27A-STOP  
Z8741 FILTER 300 31P-PASS /119S-STOP  
Z13373 FILTER 300 31P-PASS/195PT-STOP  
Z9244 FILTER 300 6LI-PASS / 2H-STOP  
Z7779 FILTER 300 6LI-PASS / 15N-STOP  
Z9384 FILTER 300 LDA/4-TRAFO 13C/31P

-----  
Z13284 FILTER 360 1H-PASS / 19F-STOP  
Z00109 FILTER 360 2H PASS  
Z00117 FILTER 360 2H STOP  
Z13330 FILTER 360 0-31P,19F-LP (1H)  
Z14332 FILTER 360 0-31P-LP (19F-3H)  
Z42364 FILTER 360 13C-PASS / 2H-STOP  
Z8829 FILTER 360 13C-PASS / 15N-STOP  
Z6828 FILTER 360 13C-PASS / 31P-STOP  
Z42363 FILTER 360 15N-PASS / 2H-STOP  
Z8830 FILTER 360 15N-PASS / 13C-STOP  
Z13903 FILTER 360 19F-BANDPASS  
Z6829 FILTER 360 31P-PASS / 13C-STOP  
Z41153 FILTER 360 LDA/4-TRAFO 13C/31P

-----  
Z13271 FILTER 400 1H-PASS / 19F-STOP  
Z14180 FILTER 400 1H-LP(3H)  
Z6850 FILTER 400 1H-PASS/205TL-STOP  
Z00118 FILTER 400 2H STOP  
Z9032 FILTER 400 2H-PASS / 13C-STOP  
Z9093 FILTER 400 2H-PASS / 15N-STOP  
Z12805 FILTER 400 2H-PASS / 171YB-ST  
Z5785 FILTER 400 2H-PASS / 31P-STOP  
Z13204 FILTER 400 2H-PASS 400W

## Available Filters (July 2002)

Z14181 FILTER 400 3H-HP(1H)  
Z13331 FILTER 400 0-31P,19F-LP (1H)  
Z14333 FILTER 400 0-31P-LP (19F-3H)  
Z13148 FILTER 400 10B-PASS / 11B-STOP  
Z13149 FILTER 400 11B-PASS / 10B-STOP  
Z14107 FILTER 400 13C-BP (0-29SI,P-H)  
Z9095 FILTER 400 13C-PASS / 2H-STOP  
Z13432 FILTER 400 13C-PASS / 11B-STOP  
Z8831 FILTER 400 13C-PASS / 15N-STOP  
Z6841 FILTER 400 13C-PASS / 31P-STOP  
Z9094 FILTER 400 15N-PASS / 2H-STOP  
Z8832 FILTER 400 15N-PASS / 13C-STOP  
Z12806 FILTER 400 171YB-PASS / 2H-STOP  
Z13774 FILTER 400 19F-BANDPASS  
Z6849 FILTER 400 205TL-PASS/ 1H-STOP  
Z13202 FILTER 400 23NA-PASS /31P-STOP  
Z13322 FILTER 400 27AL-PASS /31P-STOP  
Z13976 FILTER 400 31P-BP (0-13C,1H)  
Z6840 FILTER 400 31P-PASS / 13C-STOP  
Z13323 FILTER 400 31P-PASS /27AL-STOP  
Z7785 FILTER 400 57FE PASS / 1H-STOP  
Z42408 FILTER 400 6LI-PASS / 2H-STOP  
Z13017 FILTER 400 LDA/4-TRAFO 13C/31P  
-----  
Z13272 FILTER 500 1H-PASS / 19F-STOP  
Z13794 FILTER 500 1H-PASS / 3H-STOP  
Z00111 FILTER 500 2H PASS  
Z00119 FILTER 500 2H STOP  
Z9031 FILTER 500 2H-PASS / 13C-STOP  
Z9033 FILTER 500 2H-PASS / 15N-STOP  
Z4637 FILTER 500 2H-PASS / 31P-STOP  
Z13696 FILTER 500 2H-PASS / 6LI-STOP  
Z13795 FILTER 500 3H-HP (1H)  
Z13697 FILTER 500 6LI-PASS / 2H-STOP  
Z13698 FILTER 500 6LI-PASS /15N-STOP  
Z13332 FILTER 500 0-31P,19F-LP (1H)  
Z14334 FILTER 500 0-31P-LP (19F-3H)

Z14299 FILTER 500 117SN-LP (119SN)  
 Z14300 FILTER 500 119SN-HP (117SN)  
 Z13226 FILTER 500 119SN-PASS/31P-STOP  
 Z13114 FILTER 500 11B-PASS / 13C-STOP  
 Z14067 FILTER 500 13C-BP (0-29SI,P-H)  
 Z8917 FILTER 500 13C-PASS / 2H-STOP  
 Z13113 FILTER 500 13C-PASS / 11B-STOP  
 Z8745 FILTER 500 13C-PASS / 15N-STOP  
 Z6807 FILTER 500 13C-PASS / 31P-STOP  
 Z42638 FILTER 500 13C-PASS /203TL-STP  
 Z8916 FILTER 500 15N-PASS / 2H-STOP  
 Z8744 FILTER 500 15N-PASS / 13C-STOP  
 Z13692 FILTER 500 15N-PASS /29SI-STOP  
 Z13597 FILTER 500 19F-BANDPASS  
 Z12866 FILTER 500 19F-PASS / 31P-STOP  
 Z13346 FILTER 500 19F-PASS /205TL-STP  
 Z42639 FILTER 500 203T-PASS / 13C-STP  
 Z13345 FILTER 500 205TL-PASS /19F-STP  
 Z13693 FILTER 500 29SI-PASS /15N-STOP  
 Z13144 FILTER 500 29SI-PASS/31P-STOP  
 Z14071 FILTER 500 31P-BP (0-13C,1H)  
 Z6808 FILTER 500 31P-PASS / 13C-STOP  
 Z13145 FILTER 500 31P-PASS/29SI-STOP  
 Z8891 FILTER 500 LDA/4-TRAFO 13C/31P  
 -----  
 Z13273 FILTER 600 1H-PASS / 19F-STOP  
 Z14042 FILTER 600 1H-PASS / 3H-STOP  
 Z6684 FILTER 600 2H PASS  
 Z6685 FILTER 600 2H STOP  
 Z9087 FILTER 600 2H-PASS / 13C-STOP  
 Z9089 FILTER 600 2H-PASS / 15N-STOP  
 Z8753 FILTER 600 2H-PASS / 19F-STOP  
 Z14260 FILTER 600 3H-HP(1H)  
 Z13333 FILTER 600 0-31P,19F-LP (1H)  
 Z14335 FILTER 600 0-31P-LP (19F-3H)  
 Z14631 FILTER 600 13C-BP (0-29Si,P-H)  
 Z9086 FILTER 600 13C-PASS / 2H-STOP

## Available Filters (July 2002)

Z4132 FILTER 600 13C-PASS / 15N-STOP  
Z6901 FILTER 600 13C-PASS / 31P-STOP  
Z9088 FILTER 600 15N-PASS / 2H-STOP  
Z4131 FILTER 600 15N-PASS / 13C-STOP  
Z13904 FILTER 600 19F-BANDPASS  
Z14632 FILTER 600 31P-BP (0-13C,1H)  
Z15088 FILTER 600 31P-HP (2H)  
Z6900 FILTER 600 31P-PASS / 13C-STOP

-----  
Z14547 FILTER 700 1H-PASS / 19F-STOP  
Z14841 FILTER 700 0-13C-LP (31P)  
Z13501 FILTER 700 0-31P-LP (19F-3H)  
Z15283 FILTER 700 13C BP(0-29SI,P-H)  
Z13500 FILTER 700 13C-PASS / 2H-STOP  
Z14711 FILTER 700 13C-1H HP(15N)  
Z15284 FILTER700 15N BP (2H-1H)  
Z13498 FILTER 700 15N-PASS / 2H-STOP  
Z13905 FILTER 700 19F-BANDPASS  
Z15105 FILTER 700 31P BP(0-11B,19F-H)  
Z14842 FILTER 700 31P-1H-HP (2H)

-----  
Z13286 FILTER 750 1H-PASS / 19F-STOP  
Z7836 FILTER 750 2H PASS  
Z12935 FILTER 750 2H STOP  
Z13099 FILTER 750 2H-PASS / 15N-STOP  
Z14336 FILTER 750 0-31P-LP (19F-3H)  
Z14216 FILTER 750 13C-BP (0-29SI,P-H)  
Z41122 FILTER 750 13C-PASS / 2H-STOP  
Z12864 FILTER 750 13C-PASS / 15N-STOP  
Z12812 FILTER 750 13C-PASS / 31P-STOP  
Z41123 FILTER 750 15N-PASS / 2H-STOP  
Z12865 FILTER 750 15N-PASS / 13C-STOP  
Z13906 FILTER 750 19F-BANDPASS  
Z13334 FILTER 750 19F-PASS / 1H-STOP  
Z12813 FILTER 750 31P-PASS / 13C-STOP  
Z15033 FILTER 750 31P-HP (2H)

Z13288 FILTER 800 1H-PASS / 19F-STOP  
Z12937 FILTER 800 2H STOP  
Z7839 FILTER 800 2H-PASS / 15N-STOP  
Z13936 FILTER 800 0-13C LP (31P)  
Z13937 FILTER 800 0-31P-LP (19F-3H)  
Z7837 FILTER 800 13C-PASS / 2H-STOP  
Z13936 FILTER 800 13C-PASS / 31P-STOP  
Z7838 FILTER 800 15N-PASS / 2H-STOP  
Z13909 FILTER 800 19F-BANDPASS  
Z13335 FILTER 800 19F-PASS / 1H-STOP  
Z13938 FILTER 800 31P-1H HP (2H)

-----  
Z14645 FILTER 900 0-13C-LP (31P)  
Z13551 FILTER 900 0-15N-LP(2H,19F-1H)  
Z14123 FILTER 900 0-31P-LP (19F-3H)  
Z13550 FILTER 900 13C-1H-HP (2H)  
Z13907 FILTER 900 19F-BANDPASS



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**Tables**



# *Notes*