Bruker BioSpin

Filter Configurations

for High Resoluton NMR (and HR MAS)

Version 007

think forward

NMR Spectroscopy

This manual was written by

Arthur Schwilch

Fällanden, Switzerland

P/N: Z31430
DWG-Nr.: 1140007

For further technical assistance on the High Resolution NMR (and HR MAS) unit, please do not hesitate to contact your nearest BRUKER dealer or contact us directly at:

BRUKER BioSpin AG
Industriestr. 26
CH-8117 Fällanden
Switzerland

Phone: + 41 44 825 91 11
FAX: + 41 44 825 96 96
Email: sales@bruker-biospin.ch
Internet: www.bruker.com

Contents

Contents

Index

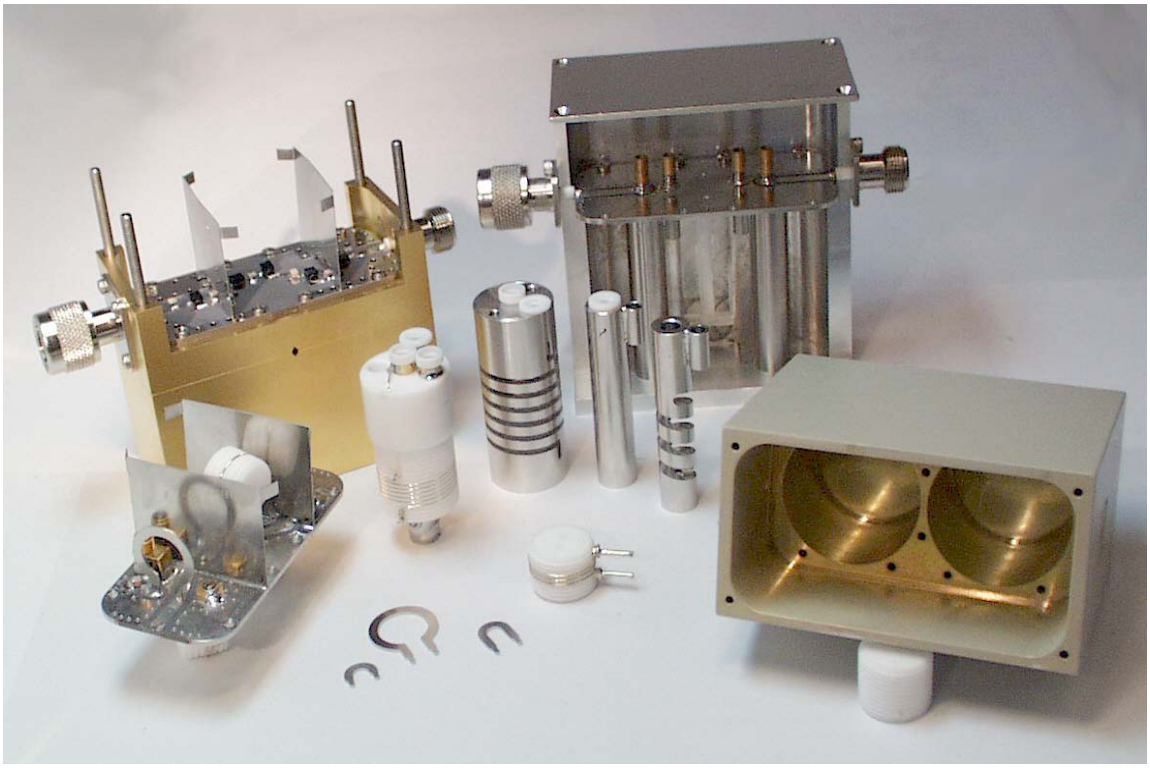
S

T

Filter Configurations for HR NMR and HR MAS

1

Figure 1.1. High Resolution NMR Filters and Filtercomponents

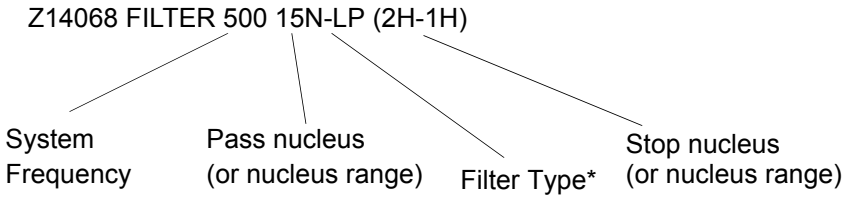


Introduction 1.1

! For use of phased-out filters (not mentioned in Table page 51) or old HPPR modules see previous manual versions.

- 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.

- 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 (November 2008)" on page 51***.
- No additional filters are necessary in the lock channel.
- No additional filters are necessary for cryoprobe operation.
- 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/2 and not on the probe
- In cause of more than one filter, the 2H stop should be mounted closer to the HPPR
- For filters with increased EMC and shielding requirements see the corresponding EC.
- Explanation of the filter nomenclature:



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

- Special ”non reflective” (NR) filters are available for 15N (e.g. FILTER 900 15N-NR (2H,F-H). The second harmonic of 15N is being terminated and not reflected by the filter.

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

Preamplifier	
HPPR/2 1H MODULE 200-250	
AQS 1H2H PREAMP 300-400	
HPPR/2 1H2H MODULE 300-400	
HPPR/2 1H LNA MODULE 500-900	
HPPR/2 1H HPLNA MODULE 200-1000	

a AVIII Spectrometer

Table 1.2. Currently[a] used preamplifiers for X (HR)

Preamplifier	
HPPR/2 XBB19F 2HS MODULE 200-250, 500-700	
HPPR/2 XBB31P 2HS MODULE 750-1000	
AQS XBB19F 2HS PREAMP 300-400	
HPPR/2 XBB19F 2HS MODULE 300-400	

aAVIII Spectrometer

Filter Requirements Questionnaire *1.2*

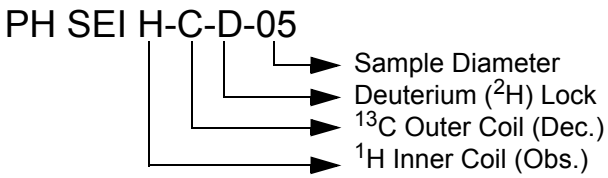
Please fill in the following questionnaire for each probe.

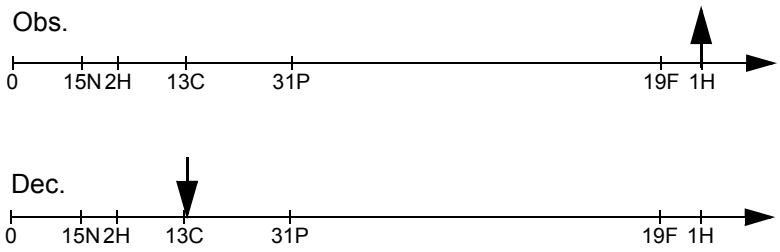
(Part. Nr. / Ser. Nr.)

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

SEI (Selective Inverse) *1.3*

Example:





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/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
	HPPR/2 1H LNA MODULE 500-900 	-
Decoupling Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-
	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/2 1H HPLNA MODULE 200-1000 	1H-PASS / 19-F STOP 
	HPPR/2 1H MODULE 200-250 	1H-PASS / 19-F STOP 
	AQS 1H2H PREAMP 300-400 	
	HPPR/2 1H2H MODULE 300-400 	
	HPPR/2 1H LNA MODULE 500-900 	1H-PASS / 19-F STOP 
Decoupling Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P,19F-LP (1H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	not possible
	AQS XBB19F 2HS PREAMP 300-400 	-[a]
	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

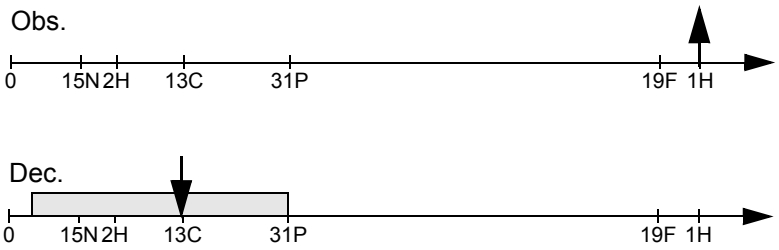
19F Observe/1H Decoupling might be possible with this configuration.

BBI (Broad Band Inverse) *1.4*

Example:

PH BBI H-BB-D-05

- Sample Diameter
- Deuterium (^{2}H) Lock
- BB (^{107}Ag...^{31}P) Outer Coil (Dec.)
- ^{1}H Inner Coil (Obs.)



Required Filters:

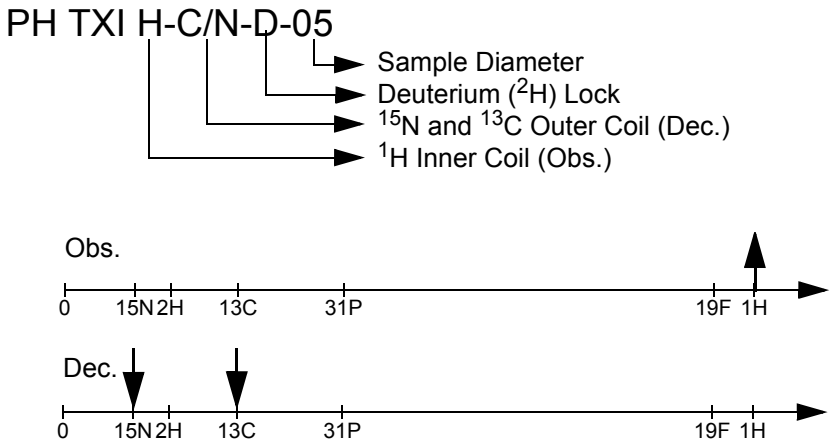
Table 1.5. Required Filters for PH BBI H-BB-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	AQS 1H2H PREAMP 300-400 	
	HPPR/2 1H2H MODULE 300-400 	
	HPPR/2 1H LNA MODULE 500-900 	-
Decoupling Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-

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

TXI (Triple X-Nuclei Inverse) *1.5*

Example:



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/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	AQS 1H2H PREAMP 300-400 	
	HPPR/2 1H2H MODULE 300-400 	
	HPPR/2 1H LNA MODULE 500-900 	-
Decoupling Path X-BB Preamplifier 13C	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P-LP (19F-3H)  13C-Pass / 2H-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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.

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/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	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/2 XBB19F 2HS MODULE 200-250, 500-700 	13C-Pass / 31P-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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/2 XBB19F 2HS MODULE 200-250, 500-700 	31-P-Pass /13C-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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 

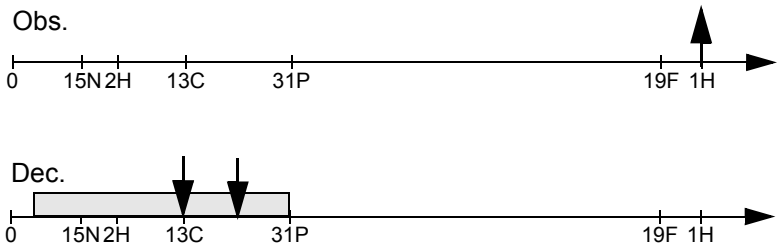
13C Observe/ 1H Decoupling might be possible with this configuration.
For 31P Observe the X-BB Preamplifier must be plugged in the 31P channel.

TBI (Triple Broad Band Inverse) *1.6*

Example:

PH TBI H-C/BB-D-05

- Sample Diameter
- Deuterium (^{2}H) Lock
- ^{13}C and BB (^{107}Ag...^{31}P) Outer Coil (Dec.)
- ^{1}H Inner Coil (Obs.)



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/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	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/2 XBB19F 2HS MODULE 200-250, 500-700 	a b
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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.

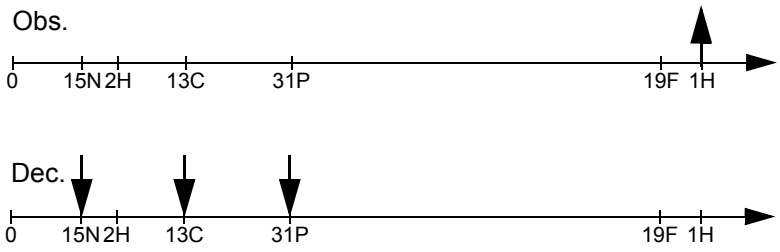
13C Observe/ 1H Decoupling might be possible with this configuration.

QXI (Quattro X-Nuclei Inverse) *1.7*

Example:

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

- Sample Diameter
- Deuterium (^{2}H) Lock
- 15N and 13C Outer Coil (Dec.)
- 31P Inner Coil (Dec.)
- 1H Inner Coil (Obs.)



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/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	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/2 XBB19F 2HS MODULE 200-250, 500-700 	13C-BP (0-SI,11B-H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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.

Table 1.10. Required Filters for PH QXI H/F-C/N-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	1H-PASS / 19-F STOP 
	HPPR/2 1H MODULE 200-250 	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 13C	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	13C-BP (0-SI,11B-H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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 19F	no Preamplifier or some X Preamplifier	0-31P,19F-LP (1H)  19F-BANDPASS 

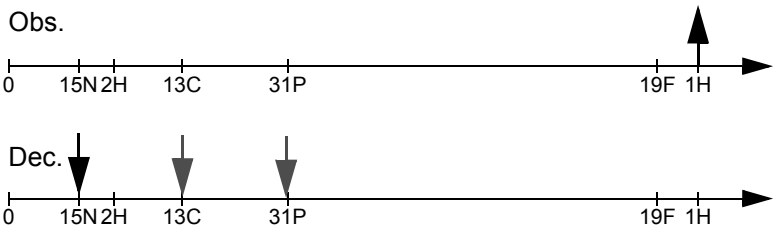
13C Observe/ 1H Decoupling might be possible with this configuration.

QNI (Quattro Nuclei Inverse) *1.8*

Example:

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

- Sample Diameter
- Deuterium (^{2}H) Lock
- ^{15}N, ^{13}C and ^{31}P Outer Coil, switchable (Dec.)
- ^{1}H Inner Coil (Obs.)



Required Filters:

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

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-

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

Table 1.12. Required Filters for PH QNI H-F/P/C -D

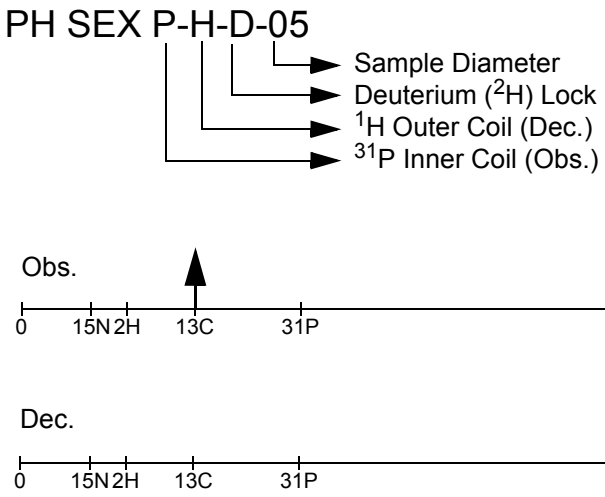
Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	1H-Pass / 19F-Stop 
	HPPR/2 1H MODULE 200-250 	1H-Pass / 19F-Stop 
	HPPR/2 1H LNA MODULE 500-900 	1H-Pass / 19F-Stop 
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P,19F-LP (1H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	19F decoupling not possible
	AQS XBB19F 2HS PREAMP 300-400 	-[a]
	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.

SEX, Dual (Selective X-Nuclei) *1.9*

Example:



Required Filters:

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

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier 13C	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	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.

Table 1.14. Required Filters for PH SEX 3H-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 3H Preamplifier	HPPR/2 3H MODULE 	3H-HP(1H) 
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	1H-LP(3H) 
	HPPR/2 1H MODULE 200-250 	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 1.15. Required Filters for PH SEX 2H-H-F

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 2H Preamplifier	HPPR/2 2H MODULE 200-250, 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	1H-Pass / 19F-Stop 
	HPPR/2 1H MODULE 200-250 	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 	-

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

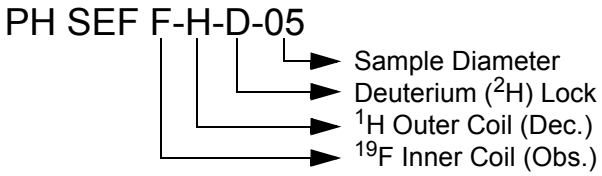
Table 1.16. Filters for PH SEX X-H-D (x=all X-nuclei except 2H, 3H, 13C)

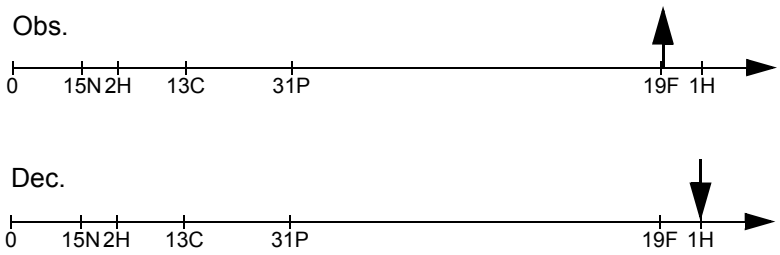
Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	-
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	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.

SEF (Selective 19F) *1.10*

Example:





Required Filters:

Table 1.17. Required Filters for PH SEF F-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 19F Preamplifier	HPPR/2 19F MODULE 	0-31P,19F-LP (1H) 
	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P,19F-LP (1H) 
	AQS XBB19F 2HS PREAMP 300-400 	-[a]
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	1H-PASS /19F-STOP 
	HPPR/2 1H MODULE 200-250 	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 only for ECL <=1 Filter 0-31P,19F-LP(1H) is required

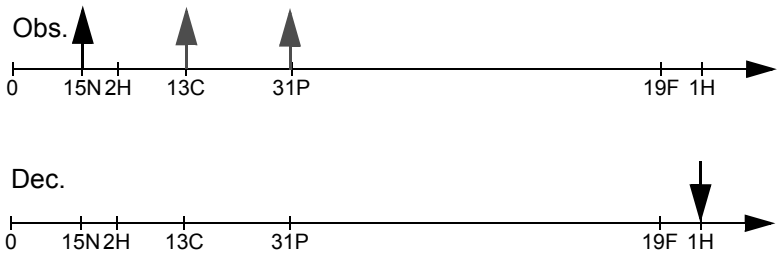
1H Observe / 19F Decoupling might be possible with this configuration.

QNP (Quattro Nuclei Probe) *1.11*

Example:

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

- Sample Diameter
- Deuterium (^{2}H) Lock
- ^{1}H Outer Coil (Dec.)
- ^{15}N, ^{13}C and ^{31}P Inner Coil switchable (Obs.)



Required Filters:

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

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	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.

Table 1.19. Required Filters for PH QNP F/P/C -H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P,19F-LP (1H)  0-31P-LP (19F-3H)[a] 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	19F observe not possible
	AQS XBB19F 2HS PREAMP 300-400 	-[b]
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	1H-Pass / 19F-Stop 
	HPPR/2 1H MODULE 200-250 	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 13C decoupling and must be removed for 19F decoupling or observe

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

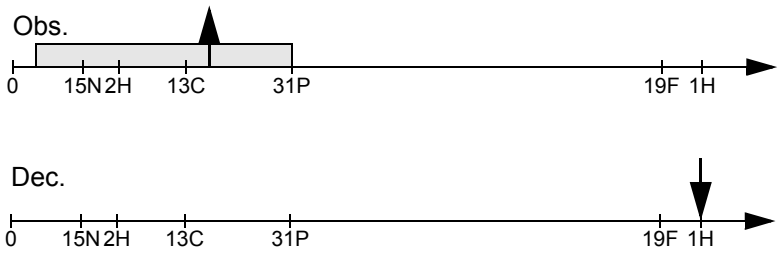
1H Observe / X Decoupling might be possible with this configuration.

BBO (Broad Band Observe) *1.12*

Example:

PH BBO BB-H-D-05

- Sample Diameter
- Deuterium (^{2}H) Lock
- ^{1}H Outer Coil (Dec.)
- BB (^{107}Ag...^{31}P) Inner Coil (Obs.)



Required Filters:

Table 1.20. Required Filters for PH BBO BB-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-
	AQS XBB19F 2HS PREAMP 300-400 	-
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	HPPR/2 1H LNA MODULE 500-900 	-
	AQS 1H2H PREAMP 300-400 	-
	HPPR/2 1H2H MODULE 300-400 	-

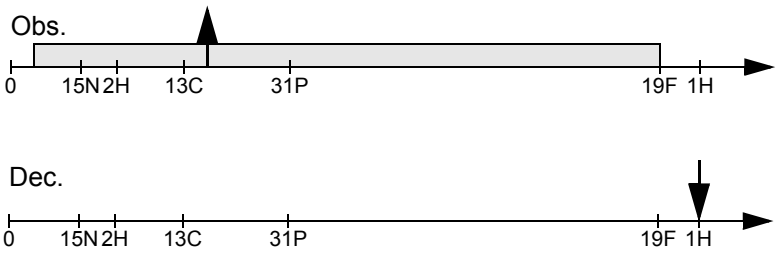
1H Observe / X Decoupling might be possible with this configuration.

BBO BBF-H (Broad Band Observe) *1.13*

Example:

PA BBO BBF-H-D-05 Z

- Sample Diameter
- Deuterium (^{2}H) Lock
- ^{1}H Outer Coil (Dec.)
- BB19F (^{107}Ag...^{19}F) Inner Coil (Obs.)



Required Filters:

Table 1.21. Required Filters for PH BBO BBF-H

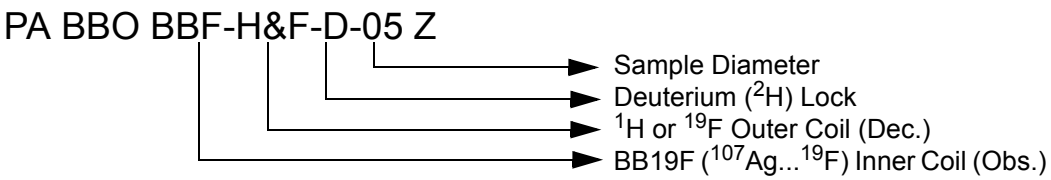
Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P,19F-LP (1H)  0-31P-LP (19F-3H)[a] 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	19F observe not possible
	AQS XBB19F 2HS PREAMP 300-400 	-[b]
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	1H-Pass / 19F-Stop 
	HPPR/2 1H MODULE 200-250 	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 	-

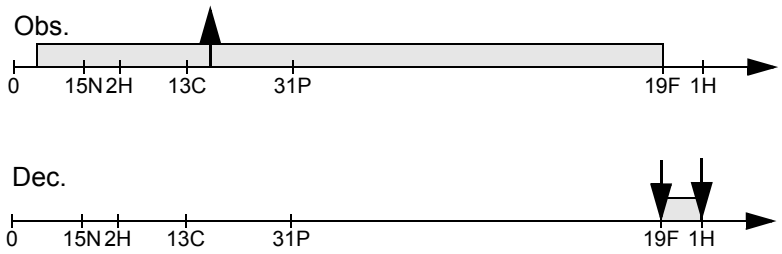
a This filter is only necessary for 13C decoupling and must be removed for 19F decoupling or observe

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

BBO BBF-H&F (Broad Band Observe) *1.14*

Example:





Depending on the decoupling nucleus, different filter configurations are required.

Required Filters:

Table 1.22. Required Filters for PH BBO BBF-H&F for Experiments with 1H Decoupling

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P,19F-LP (1H)  0-31P-LP (19F-3H)[a] 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	19F observe not possible
	AQS XBB19F 2HS PREAMP 300-400 	-[b]
	HPPR/2 XBB19F 2HS MODULE 300-400 	-
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	1H-Pass / 19F-Stop 
	HPPR/2 1H MODULE 200-250 	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 13C decoupling and must be removed for 19F decoupling or observe

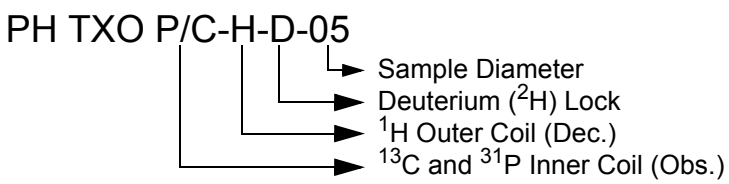
b only for ECL <=1 Filter 0-31P,19F-LP(1H) is required

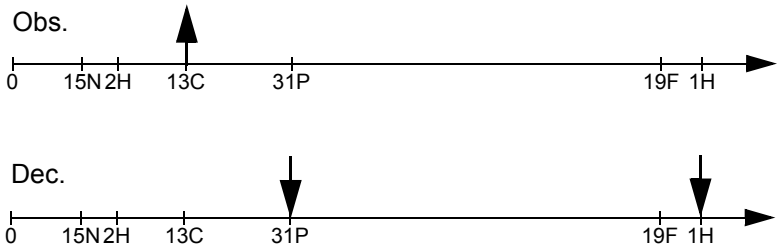
Table 1.23. Required Filters for PH BBO BBF-H&F for Experiments with 19F Decoupling and 107Ag-31P Observe

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-
	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	no preamplifier (1H preamplifier must be bypassed for 19F decoupling)	19F-BANDPASS 

TXO (Triple X-Nuclei Observe) *1.15*

Example:





Required Filters:

Table 1.24. 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/2 XBB19F 2HS MODULE 200-250, 500-700 	X-Pass / Y-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	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/2 XBB19F 2HS MODULE 200-250 500-700 	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 

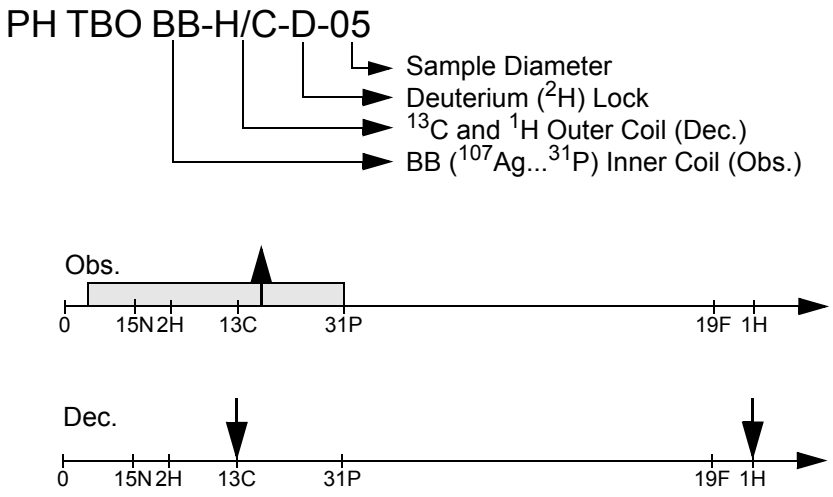
Table 1.25. Required Filters for PH TXO F/Y-H-D (with X=19F)

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	19F Bandpass 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-not possible
	AQS XBB19F 2HS PREAMP 300-400 	19F Bandpass 
	HPPR/2 XBB19F 2HS MODULE 300-400 	19F Bandpass 
Decoupling Path 1H Preamplifier	HPPR/2 1H HPLNA MODULE 200-1000 	1H-Pass / 19F-Stop 
	HPPR/2 1H MODULE 200-250 	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/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-
	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.

TBO (Triple Broad Band Observe) *1.16*

Example:

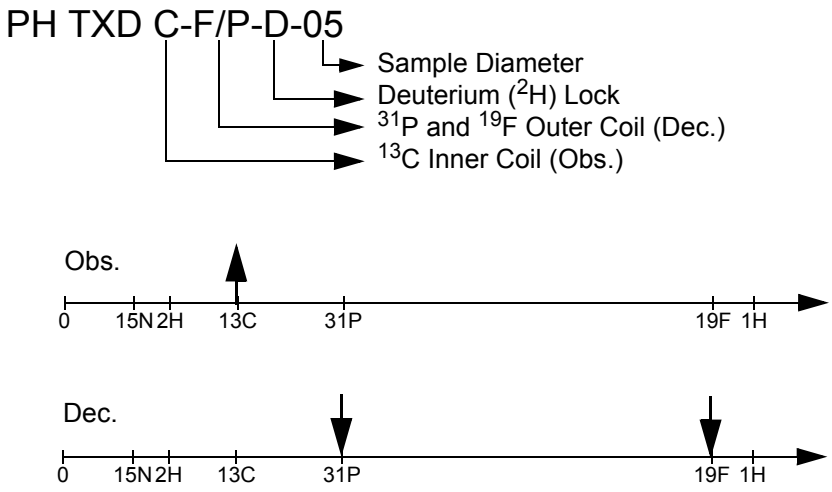


Required Filters:

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

TXD (Triple X-Nuclei Double Decoupling) *1.17*

Example:



Required Filters:

Table 1.26. Required Filters for PH TXD X-H/Y-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	X-Pass / Y-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	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/2 XBB19F 2HS MODULE 200-250, 500-700 	Y-Pass / X-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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 1.27. Required Filters for PH TXD X-F/Z-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	X-Pass / Y-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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 preampliferi or some X preamplifier	19F Bandpass 
Decoupling Path Z	no preamplifer	2H Stop  Z-Pass / X-Stop 
	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	Z-Pass / X-Stop 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	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 

Table 1.28. Required Filters for PH TXD X-H/F-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	HPPR/2 XBB19F 2HS MODULE 200-250, 500-700 	0-31P-LP (19F-3H) 
	HPPR/2 XBB31P 2HS MODULE 750-1000 	-
	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/2 1H HPLNA MODULE 200-1000 	-
	HPPR/2 1H MODULE 200-250 	
	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 

Available Filters (November 2008) **2**

Z102659 FILTER 85 0-31P,19F-LP (1H)
Z41044 FILTER BIOSPEC- 85 1H+19F PASS

Z00113 FILTER 100 2H STOP
Z14345 FILTER 100 0-31P,19F-LP (1H)
Z002044 FILTER BIOSPEC-100 1H+19F PASS

Z9214 FILTER BIOSPEC-125 1H+19F PASS
Z14903 FILTER 125 0-31P,19F-LP (1H)

Z002054 FILTER BIOSPEC-200 1H+19F PASS
Z13381 FILTER 200 1H-BANDPASS
Z13281 FILTER 200 1H-PASS / 19F-STOP
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
Z13083 FILTER 200 13C-PASS / 2H-STOP
Z6842 FILTER 200 13C-PASS / 31P-STOP
Z13908 FILTER 200 19F-BANDPASS
Z12967 FILTER 200 23NA-PASS /31P-STOP
Z13015 FILTER 200 27AL-PASS /31P-STOP
Z41001 FILTER 200 31P-PASS / 11B-STOP
Z6843 FILTER 200 31P-PASS / 13C-STOP
Z12968 FILTER 200 31P-PASS /23NA-STOP

Z13382 FILTER 250 1H-BANDPASS
Z13279 FILTER 250 1H-PASS / 19F-STOP

Z00115 FILTER 250 2H STOP
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
Z9146 FILTER 250 13C-PASS / 2H-STOP
Z6818 FILTER 250 13C-PASS / 31P-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
Z110651 FILTER 250 1H-HP(0-13C)
Z9774 FILTER 250 205TL-PASS/ 1H-STOP
Z6819 FILTER 250 31P-PASS / 13C-STOP
Z12811 FILTER 250 31P-PASS/103RH-STOP

Z002084 FILTER BIOSPEC-300 1H+19F PASS
Z13383 FILTER 300 1H-BANDPASS
Z13763 FILTER 300 1H-LP (3H)
Z13270 FILTER 300 1H-PASS / 19F-STOP
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-HP (1H)
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-SI,11B-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

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
Z102690 FILTER 300 7LI - 1H-HP (13C)
Z9384 FILTER 300 LDA/4-TRAFO 13C/31P

Z13384 FILTER 360 1H-BANDPASS
Z13284 FILTER 360 1H-PASS / 19F-STOP
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

Z13385 FILTER 400 1H-BANDPASS
Z13271 FILTER 400 1H-PASS / 19F-STOP
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
Z14181 FILTER 400 3H-HP (1H)
Z104117 FILTER 400 0-13C LP (119SN)

Z13331 FILTER 400 0-31P,19F-LP (1H)
Z14333 FILTER 400 0-31P-LP (19F-3H)
Z13148 FILTER 400 10B-PASS / 11B-STOP
Z104116 FILTER 400 119SN BP(0-24NA,19F-1H)
Z14324 FILTER 400 11B-BP (0-23NA,P-H)
Z13149 FILTER 400 11B-PASS / 10B-STOP
Z14107 FILTER 400 13C-BP (0-SI,11B-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-STO
Z104194 FILTER 400 19F-1H HP(0-31P)
Z13774 FILTER 400 19F-BANDPASS
Z14180 FILTER 400 1H-LP (3H)
Z6849 FILTER 400 205TL-PASS/ 1H-STOP
Z13202 FILTER 400 23NA-PASS /31P-STOP
Z13322 FILTER 400 27AL-PASS /31P-STOP
Z15309 FILTER 400 29SI-BP(0-2H,13C-H)
Z13976 FILTER 400 31P-BP(0-11B,19F-H)
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

Z13794 FILTER 500 1H-LP (3H)
Z13272 FILTER 500 1H-PASS / 19F-STOP
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
Z13795 FILTER 500 3H-HP (1H)
Z102949 FILTER 500 0-13C LP (119SN)
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)
Z13114 FILTER 500 11B-PASS / 13C-STOP
Z14067 FILTER 500 13C-BP (0-SI,11B-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-NR(2H,F-H)
Z8744 FILTER 500 15N-PASS / 13C-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
Z104159 FILTER 500 31P-1H HP(13C)
Z14071 FILTER 500 31P-BP(0-11B,19F-H)
Z14973 FILTER 500 31P-HP (2H)
Z6808 FILTER 500 31P-PASS / 13C-STOP
Z13145 FILTER 500 31P-PASS/29SI-STOP

Z14042 FILTER 600 1H-LP (3H)
Z13273 FILTER 600 1H-PASS / 19F-STOP
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)
Z100315 FILTER 600 101RU-LP (15N-H)
Z14631 FILTER 600 13C-BP(0-SI,11B-H)
Z9086 FILTER 600 13C-PASS / 2H-STOP
Z4132 FILTER 600 13C-PASS / 15N-STOP
Z6901 FILTER 600 13C-PASS / 31P-STOP

Z9088 FILTER 600 15N-NR(2H,F-H)
Z4131 FILTER 600 15N-PASS / 13C-STOP
Z13904 FILTER 600 19F-BANDPASS
Z14632 FILTER 600 31P-BP(0-11B,19F-H)
Z15088 FILTER 600 31P-HP (2H)
Z6900 FILTER 600 31P-PASS / 13C-STOP

Z13900 FILTER 700 1H-BANDPASS
Z14841 FILTER 700 0-13C-LP (31P)
Z13501 FILTER 700 0-31P-LP (19F-3H)
Z14711 FILTER 700 13C-1H-HP(15N)
Z15283 FILTER 700 13C-BP (0-29SI,P-H)
Z13500 FILTER 700 13C-PASS / 2H-STOP
Z13498 FILTER 700 15N-NR(2H,F-H)
Z13905 FILTER 700 19F-BANDPASS
Z14993 FILTER 700 19F-BP (0-31P,1H)
Z14842 FILTER 700 31P-1H-HP (2H)
Z15105 FILTER 700 31P-BP(0-11B,19F-H)

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-NR(2H,F-H)
Z12865 FILTER 750 15N-PASS / 13C-STOP
Z13906 FILTER 750 19F-BANDPASS
Z15033 FILTER 750 31P-1H HP(2H)
Z12813 FILTER 750 31P-PASS / 13C-STOP

Z7839 FILTER 800 2H-PASS / 15N-STOP
Z13936 FILTER 800 0-13C LP (31P)
Z13937 FILTER 800 0-31P-LP (19F-3H)
Z103187 FILTER 800 13C-BP(0-Si,11B-H)
Z7837 FILTER 800 13C-PASS / 2H-STOP

Z7838 FILTER 800 15N-NR(2H,F-H)

Z13909 FILTER 800 19F-BANDPASS

Z13288 FILTER 800 1H-BP (0-31P,19F)

Z13938 FILTER 800 31P-1H HP (2H)

Z103105 FILTER 800 31P-BP(0-11B, 19F-1H)

Z104178 FILTER 850 0-31P-LP (19F-3H)

Z13901 FILTER 900 1H-BANDPASS

Z14645 FILTER 900 0-13C-LP (31P)

Z14123 FILTER 900 0-31P-LP (19F-3H)

Z13550 FILTER 900 13C-1H-HP (2H)

Z13551 FILTER 900 15N-NR(2H,F-H)

Z13907 FILTER 900 19F-BANDPASS

Z103107 FILTER 900 31P-BP(0-11B, 19F-1H)

Z106115 FILTER 950 0-31P-LP (19F-3H)

Z106131 FILTER 950 13C-1H-HP (2H)

Z106130 FILTER 950 15N-NR(2H,F-H)

Z109597 FILTER 1000 0-31P-LP (19F-3H)

Z109596 FILTER 1000 13C-1H-HP (2H)

Z109595 FILTER 1000 15N-NR(2H,F-H)

Tables

Tables

End of Document

Bruker BioSpin
your solution partner

Bruker BioSpin provides a world class, market-leading range of analysis solutions for your life and materials science needs.

Bruker BioSpin Group

info@bruker-biospin.com
www.bruker-biospin.com