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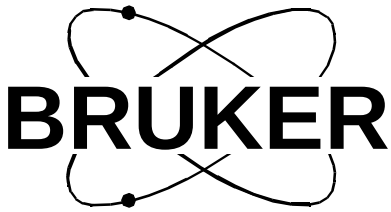

Filter Configurations

for High Resolution NMR

Version 001

BRUKER

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This manual was written by

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© December 2, 1997: Spectrospin AG

Fällanden, Switzerland

P/N: Z31430
DWG-Nr: 1140001

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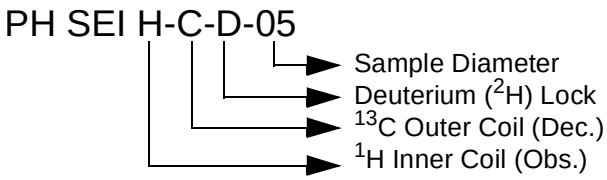
Filter Configurations 1

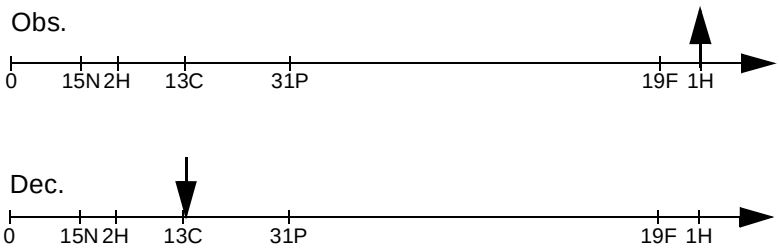
Introduction 1.1

- 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.
- 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 at the end of this chapter (***page 26***) and send it to Spectrospin AG, Production Department.
- The exact order number for the corresponding magnet frequency can be taken from the „Available Filters“ list (***page 27***).
- No filters are necessary in the lock channel.

SEI (Selective Inverse) *1.2*

Example:





Required Filters:

Table 1.1. Required Filters for PH SEI H-C-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	1H LNA	-
	1H Preamp	-
Decoupling Path X-BB Preamplifier	X-BB19F 2HP	Low Pass 1H Stop 2H Stop
	X-BB19F 2HS	Low Pass 1H Stop
	X-BB31P 2HS	-

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

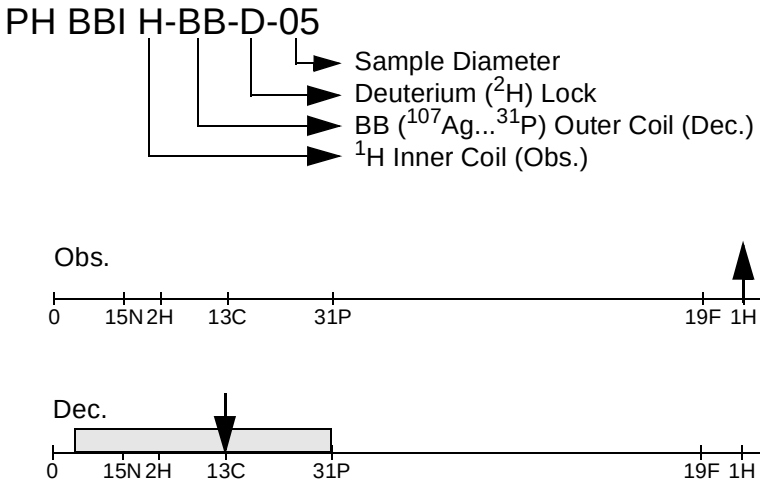
Table 1.2. Required Filters for PH SEI H-F-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	1H LNA	1H-PASS / 19-F STOP
	1H Preamp	-
Decoupling Path X-BB Preamplifier	X-BB19F 2HP	-
	X-BB19F 2HS	-
	X-BB31P 2HS	not possible

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

BBI (Broad Band Inverse) *1.3*

Example:



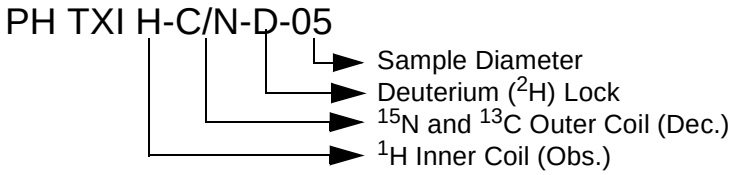
Required Filters:

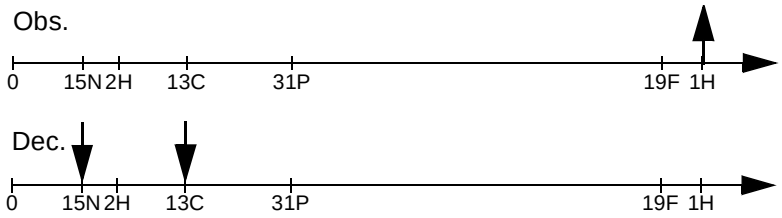
Table 1.3. Required Filters for PH BBI H-BB-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	1H LNA	-
	1H Preamp	-
Decoupling Path X-BB Preamplifier	X-BB19F 2HP	Low Pass 1H Stop 2H Stop
	X-BB19F 2HS	Low Pass 1H Stop
	X-BB31P 2HS	-

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

Example:





Required Filters:

Table 1.4. Required Filters for PH TXI H-C/N-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	1H LNA	-
	1H Preamp	-
Decoupling Path X-BB Preamplifier 13C	X-BB19F 2HP	Low Pass 1H Stop 13C-Pass / 2H-Stop
	X-BB19F 2HS	Low Pass 1H Stop 13C-Pass / 2H-Stop
	X-BB31P 2HS	13C-Pass / 2H-Stop
Decoupling Path 15N	-	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 1.5. Required Filters for PH TXI H-C/P-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	1H LNA	-
	1H Preamp	-
Decoupling Path X-BB Preamplifier 13C	X-BB19F 2HP	13C-Pass / 31P-Stop 13C-Pass / 2H-Stop
	X-BB19F 2HS	13C-Pass / 31P-Stop
	X-BB31P 2HS	13C-Pass / 31P-Stop
Decoupling Path 31P	-	Low Pass 1H Stop 31-P-Pass / 2H-Stop

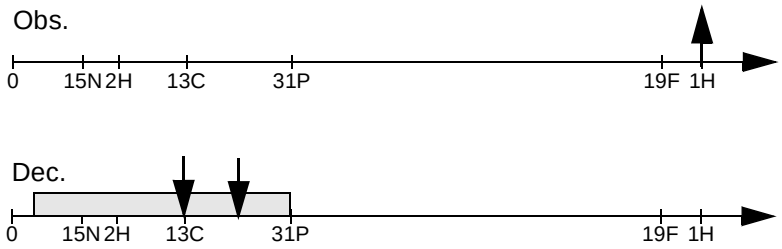
13C Observe/ 1H Decoupling might be possible with this configuration.

For 31P Observe the X-BB Preamplifier must be plugged in the 15N channel.

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

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	1H LNA	-
	1H Preamp	-
Decoupling Path X-BB Preamplifier 13C	X-BB19F 2HP	a b
	X-BB19F 2HS	a b
	X-BB31P 2HS	a b
Decoupling Path BB	-	a b

aFor 13C and 15N decoupling filter requirements is the same as ***"Required Filters for PH TXI H-C/N-D" on page 11***

bFor 13C and 31P decoupling filter requirements is the same as ***"Required Filters for PH TXI H-C/P-D" on page 12***

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

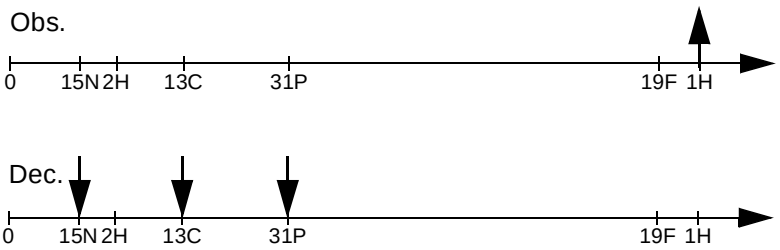
13C Observe/ 1H Decoupling might be possible with this configuration.

QXI (Quattro X-Nuclei Inverse) *1.6*

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.)



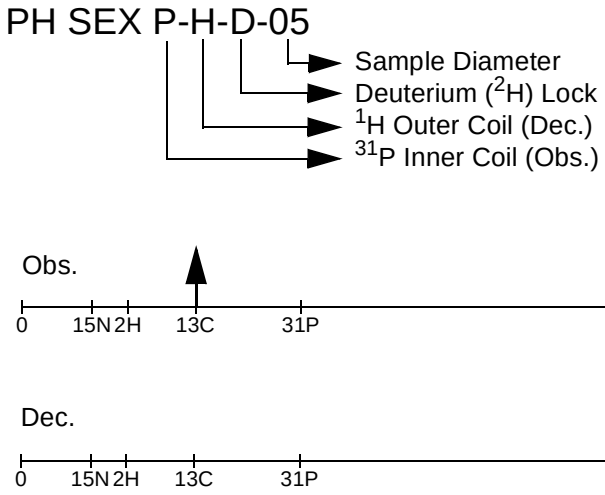
Required Filters:

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

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 1H Preamplifier	1H LNA	-
	1H Preamp	-
Decoupling Path X-BB Preamplifier 13C	X-BB19F 2HP	13C-Pass / 31P-Stop 13C-Pass / 2H-Stop
	X-BB19F 2HS	13C-Pass / 31P-Stop 13C-Pass / 2H-Stop
	X-BB31P 2HS	13C-Pass / 31P-Stop 13C-Pass / 2H-Stop
Decoupling Path 15N	-	15N-Pass / 2H-Stop
Decoupling Path 31P		Low Pass 1H Stop 31P-Pass / 2H-Stop

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

Example:



Required Filters:

Table 1.8. Required Filters for PH SEX C-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier 13C	X-BB19F 2HP	Low Pass 1H Stop 13C-Pass / 2H-Stop
	X-BB19F 2HS	Low Pass 1H Stop
	X-BB31P 2HS	-
Decoupling Path 1H Preamplifier	1H LNA	-
	1H Preamp	-

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

Table 1.9. Required Filters for PH SEX 3H-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 3H Preamplifier	3H Preamp	-
Decoupling Path 1H Preamplifier	1H LNA	1H-Pass / 3H-Stop
	1H Preamp	1H-Pass / 3H-Stop

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

Table 1.10. Required Filters for PH SEX 2H-H-F

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 2H Preamplifier	2H Preamp	-
Decoupling Path 1H Preamplifier	1H LNA	1H-Pass / 19F-Stop
	1H Preamp	-

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

Table 1.11. Filters for PH SEX X-H-D (x=all X-nuclei except 2H, 3H, 13C)

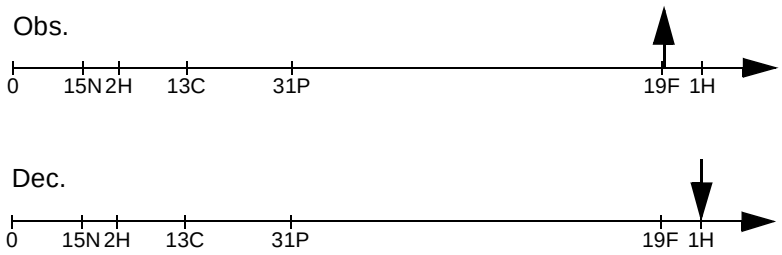
Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	X-BB19F 2HP	2H-Stop
	X-BB19F 2HS	-
	X-BB31P 2HS	-
Decoupling Path 1H Preamplifier	1H LNA	-
	1H Preamp	-

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

Example:

PH SEF F-H-D-05

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



Required Filters:

Table 1.12. Required Filters for PH SEF F-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path 19F Preamplifier	19F Preamp	-
	X-BB19F 2HP	2H-Stop
	X-BB19F 2HS	-
Decoupling Path 1H Preamplifier	1H LNA	1H-PASS / 19F-STOP
	1H Preamp	-

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

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.)

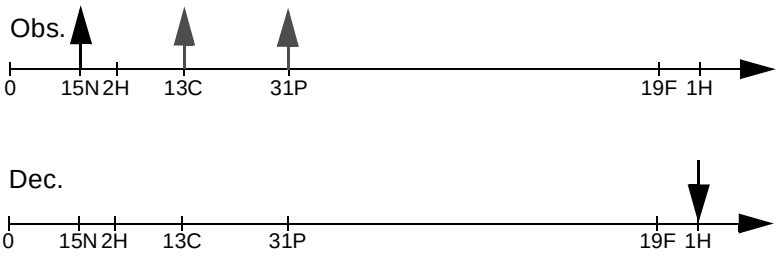


Table 1.13. Required Filters for PH QNP P/C/N-H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	X-BB19F 2HP	2H-Stop Low Pass 1H Stop
	X-BB19F 2HS	Low Pass 1H Stop
	X-BB31P 2HS	-
Decoupling Path 1H Preamplifier	1H LNA	-
	1H Preamp	-

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

Table 1.14. Required Filters for PH QNP F/P/C -H-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	X-BB19F 2HP	2H-Stop Low Pass 1H Stop[a]
	X-BB19F 2HS	Low Pass 1H Stop[a]
	X-BB31P 2HS	19F observe not possible
Decoupling Path 1H Preamplifier	1H LNA	1H-Pass / 19F-Stop
	1H Preamp	-

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

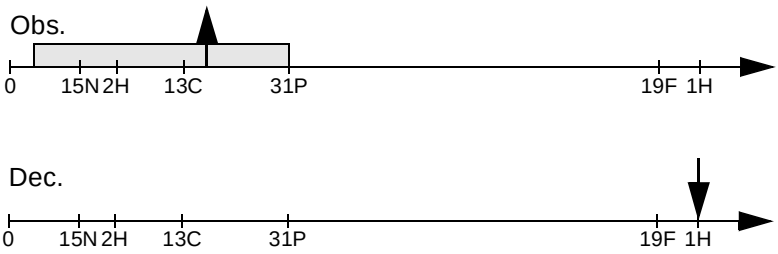
1H Observe / X Decoupling might be possible with this configuration.

BBO (Broad Band Observe) *1.10*

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 1.15. Required Filters for PH QNP BBO BB-H-D

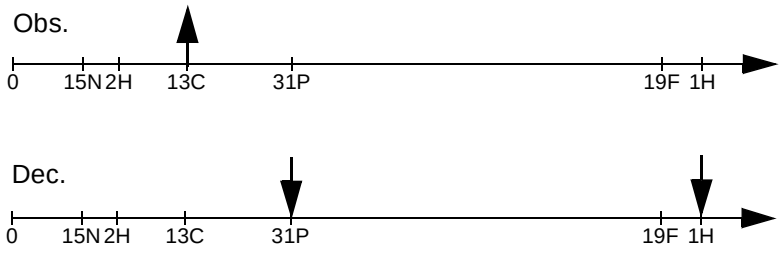
Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	X-BB19F 2HP	2H-Stop Low Pass 1H Stop
	X-BB19F 2HS	Low Pass 1H Stop
	X-BB31P 2HS	-
Decoupling Path 1H Preamplifier	1H LNA	-
	1H Preamp	-

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

Example:

PH TXO P/C-H-D-05

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



Required Filters:

Table 1.16. Required Filters for PH TXO X/Y-H-D (without 19F)

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	X-BB19F 2HP	2H-Stop X-Pass / Y-Stop
	X-BB19F 2HS	X-Pass / Y-Stop
	X-BB31P 2HS	X-Pass / Y-Stop
Decoupling Path 1H Preamplifier	1H LNA	-
	1H Preamp	-
Decoupling Path Y		2H Stop Y-Pass / X-Stop

Only X-Observe, Y and 1H Decoupling is possible with this configuration.

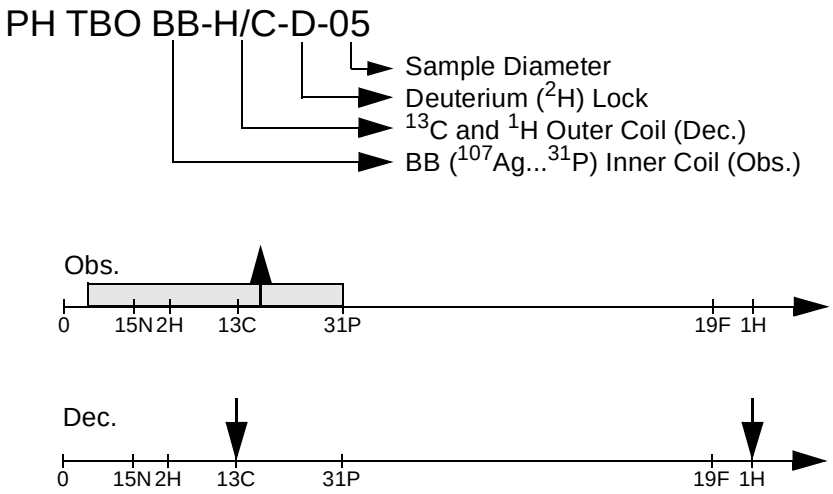
Table 1.17. Required Filters for PH TXO F/Y-H-D (with X=19F)

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	X-BB19F 2HP	19F Bandpass
	X-BB19F 2HS	19F Bandpass
	X-BB31P 2HS	-not possible
Decoupling Path 1H Preamplifier	1H LNA	1H-Pass / 19F-Stop
	1H Preamp	-
Decoupling Path Y		2H-Stop Low Pass 1H Stop

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

TBO (Triple Broad Band Observe) *1.12*

Example:



Required Filters:

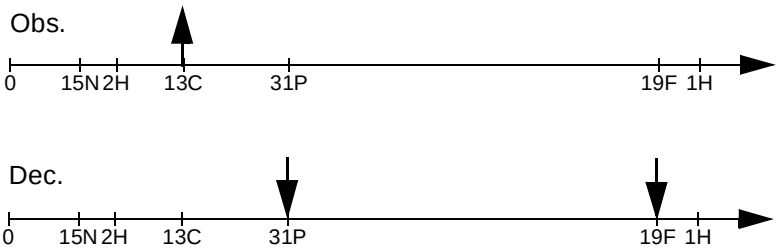
Please contact the nearest Bruker head office for TBO filter requirements.

TXD (Triple X-Nuclei Double Decoupling) *1.13*

Example:

PH TXD C-F/P-D-05

- Sample Diameter
- Deuterium (^{2}H) Lock
- ^{31}P and ^{19}F Outer Coil (Dec.)
- ^{13}C Inner Coil (Obs.)



Required Filters:

Table 1.18. Required Filters for PH TXD X-H/Y-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	X-BB19F 2HP	2H-Stop X-Pass / Y-Stop
	X-BB19F 2HS	X-Pass / Y-Stop
	X-BB31P 2HS	X-Pass / Y-Stop
Decoupling Path 1H Preamplifier	1H LNA	-
	1H Preamp	-
Decoupling Path Y		2H Stop Y-Pass / X-Stop

Table 1.19. Required Filters for PH TXD X-F/Z

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	X-BB19F 2HP	2H-Stop X-Pass / Y-Stop
	X-BB19F 2HS	X-Pass / Y-Stop
	X-BB31P 2HS	X-Pass / Y-Stop
Decoupling Path y (19F)		19F Bandpass
Decoupling Path Z		2H Stop Z-Pass / X-Stop

Table 1.20. Required Filters for PH TXD X-H/F-D

Channel (Obs./Dec.)	Preamplifier Module Type	Required Filters
Observe Path X-BB Preamplifier	X-BB19F 2HP	2H-Stop Low Pass 1H Stop
	X-BB19F 2HS	Low Pass 1H Stop
	X-BB31P 2HS	-
Decoupling Path 1H Preamplifier	1H LNA	-
	1H Preamp	-
Decoupling Path y (19F)	-	19F Bandpass

Filter Requirements Questionnaire *1.14*

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}	
...		

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Z00716 FILTER 100 1HP 19FS

Z6595 FILTER 100 BAND PASS 1H

Z6603 FILTER 100 LOW PASS 1H STOP

Z00717 FILTER 100 X,19FP 1HS

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Z13281 FILTER 200 1H-PASS / 19F-STOP

Z6727 FILTER 200 1HP 3HS

Z00106 FILTER 200 2H PASS

Z00114 FILTER 200 2H STOP

Z6726 FILTER 200 3HP 1HS

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

Z13327 FILTER 200 19F-PASS / 1H-STOP

Z8827 FILTER 200 19F-PASS / X-B STOP

Z13381 FILTER 200 1H-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

Z13111 FILTER 200 LDA/4-TRAFO 13C/31P

Z6588 FILTER 200 LOW PASS 1H STOP

Z13084 FILTER 200 LOW PASS 1H-ST 350W

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

Z13438 FILTER 250 1H-PASS / 3H-STOP

Z7816 FILTER 250 1HP 3HS

Z00107 FILTER 250 2H PASS

Z00115 FILTER 250 2H STOP

Z13439 FILTER 250 3H-PASS / 1H-STOP

Z7815 FILTER 250 3HP 1HS

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

Z13328 FILTER 250 19F-PASS / 1H-STOP

Z13382 FILTER 250 1H-BANDPASS

Z9774 FILTER 250 205TL-PASS/ 1H-STOP

Z6819 FILTER 250 31P-PASS / 13C-STOP

Z12811 FILTER 250 31P-PASS/103RH-STOP

Z6589 FILTER 250 LOW PASS 1H STOP

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Z124 FILTER 270 1HP 19FS

Z6773 FILTER 270 BAND PASS 1H

Z6590 FILTER 270 LOW PASS 1H STOP

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Z13270 FILTER 300 1H-PASS / 19F-STOP

Z6810 FILTER 300 1HP 3HS

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

Z6809 FILTER 300 3HP 1HS

Z8742 FILTER 300 119S-PASS/ 31P-STOP

Z13029 FILTER 300 119SN-P 13C-29SI-ST

Z9229 FILTER 300 11B-PASS / 31P-STOP

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

Z13104 FILTER 300 15N-PASS / 31P-STOP

Z7780 FILTER 300 15N-PASS / 6LI-STOP

Z13329 FILTER 300 19F-PASS / 1H-STOP

Z13383 FILTER 300 1H-BANDPASS

Z42428 FILTER 300 27A-PASS / 31P-STOP

Z9228 FILTER 300 31P-PASS / 11B-STOP

Z6844 FILTER 300 31P-PASS / 13C-STOP

Z13103 FILTER 300 31P-PASS / 15N-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-.2-TRAFO 13C/31

Z6591 FILTER 300 LOW PASS 1H STOP

Z13117 FILTER 300 LOW PASS 1H-ST 350W

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

Z9106 FILTER 360 1HP 3HS

Z00109 FILTER 360 2H PASS

Z00117 FILTER 360 2H STOP

Z9107 FILTER 360 3HP 1HS

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

Z13330 FILTER 360 19F-PASS / 1H-STOP

Z13384 FILTER 360 1H-BANDPASS

Z6829 FILTER 360 31P-PASS / 13C-STOP

Z41153 FILTER 360 LDA-.2-TRAFO 13C/31

Z6592 FILTER 360 LOW PASS 1H STOP

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Z13271 FILTER 400 1H-PASS / 19F-STOP

Z6820 FILTER 400 1HP 3HS

Z00110 FILTER 400 2H PASS

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
Z8752 FILTER 400 2H-PASS / 19F-STOP
Z5785 FILTER 400 2H-PASS / 31P-STOP
Z13204 FILTER 400 2H-PASS 350W
Z6821 FILTER 400 3HP 1HS
Z13148 FILTER 400 10B-PASS / 11B-STOP
Z13149 FILTER 400 11B-PASS / 10B-STOP
Z9095 FILTER 400 13C-PASS / 2H-STOP
Z13432 FILTER 400 13C-PASS / 11B-STOP
Z8831 FILTER 400 13C-PASS / 15N-STOP
Z12867 FILTER 400 13C-PASS / 19F-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
Z13331 FILTER 400 19F-PASS / 1H-STOP
Z13385 FILTER 400 1H-BANDPASS
Z6850 FILTER 400 1H-PASS/ 205TL-STOP
Z6849 FILTER 400 205TL-PASS/ 1H-STOP
Z13202 FILTER 400 23NA-PASS /31P-STOP
Z13322 FILTER 400 27AL-PASS /31P-STOP
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
Z9870 FILTER 400 BAND PASS 19F
Z12868 FILTER 400 BAND-PASS 19F
Z13017 FILTER 400 LDA/4-TRAFO 13C/31P
Z6593 FILTER 400 LOW PASS 1H STOP

Z13272 FILTER 500 1H-PASS / 19F-STOP
Z6812 FILTER 500 1HP 3HS
Z00111 FILTER 500 2H PASS
Z00119 FILTER 500 2H STOP
Z12969 FILTER 500 2H-PASS / 1H-STOP
Z9031 FILTER 500 2H-PASS / 13C-STOP
Z9033 FILTER 500 2H-PASS / 15N-STOP

Z7782 FILTER 500 2H-PASS / 19F-STOP

Z4637 FILTER 500 2H-PASS / 31P-STOP

Z6813 FILTER 500 3HP 1HS

Z13226 FILTER 500 119SN-PASS/31P-STOP

Z13114 FILTER 500 11B-PASS / 13C-STOP

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

Z13332 FILTER 500 19F-PASS / 1H-STOP

Z12866 FILTER 500 19F-PASS / 31P-STOP

Z13346 FILTER 500 19F-PASS /205TL-STP

Z13386 FILTER 500 1H-BANDPASS

Z42639 FILTER 500 203T-PASS / 13C-STP

Z13345 FILTER 500 205TL-PASS /19F-STP

Z13144 FILTER 500 29SI-PASS/31P-STOP

Z6808 FILTER 500 31P-PASS / 13C-STOP

Z13081 FILTER 500 31P-PASS/119SN-STOP

Z13145 FILTER 500 31P-PASS/29SI-STOP

Z8891 FILTER 500 LDA-.2-TRAFO 13C/31

Z6594 FILTER 500 LOW PASS 1H STOP

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Z13273 FILTER 600 1H-PASS / 19F-STOP

Z6707 FILTER 600 1HP 3HS

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

Z4117 FILTER 600 2H-PASS / 31P-STOP

Z6708 FILTER 600 3HP 1HS

Z9086 FILTER 600 13C-PASS / 2H-STOP

Z4132 FILTER 600 13C-PASS / 15N-STOP

Z6901 FILTER 600 13C-PASS / 31P-STOP

Goto

Z9088 FILTER 600 15N-PASS / 2H-STOP

Z4131 FILTER 600 15N-PASS / 13C-STOP

Z13333 FILTER 600 19F-PASS / 1H-STOP

Z13387 FILTER 600 1H-BANDPASS

Z6900 FILTER 600 31P-PASS / 13C-STOP

Z6682 FILTER 600 LOW PASS 1H STOP

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Z13286 FILTER 750 1H-PASS / 19F-STOP

Z13130 FILTER 750 1HP 3HS

Z7836 FILTER 750 2H PASS

Z12935 FILTER 750 2H STOP

Z13099 FILTER 750 2H-PASS / 15N-STOP

Z13131 FILTER 750 3HP 1HS

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

Z13334 FILTER 750 19F-PASS / 1H-STOP

Z13388 FILTER 750 1H-BANDPASS

Z12813 FILTER 750 31P-PASS / 13C-STOP

Z12936 FILTER 750 LOW PASS 1H-ST 350W

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Z13288 FILTER 800 1H-PASS / 19F-STOP

Z12937 FILTER 800 2H STOP

Z7839 FILTER 800 2H-PASS / 15N-STOP

Z7837 FILTER 800 13C-PASS / 2H-STOP

Z12938 FILTER 800 13C-PASS / 15N-STOP

Z7838 FILTER 800 15N-PASS / 2H-STOP

Z12939 FILTER 800 15N-PASS / 13C-STOP

Z13335 FILTER 800 19F-PASS / 1H-STOP

Z13199 FILTER 800 19F-PASS / 1H-STOP

Z13198 FILTER 800 1H-BANDPASS

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