



Bruker BioSpin

Bruker Sample Transport ●

BST
Installation and Technical Manual

Version 002

think forward

NMR Spectroscopy

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Introduction

1

Introduction

1.1

The Bruker Sample Transport System (BST) serves a number of purposes:

- It provides a safe and quiet transport of the sample to the probe.
- It measures the spinning rate.
- It provides position information of the sample.
- It manages the lift, spinning, and tempering gas flows to and from the spinner/probe.

The BST is a versatile piece of equipment. It can be configured and operated in a number of ways, matching exactly the experiment's needs, be it simply an easy install and forget operation, or a high performance configuration for the most demanding experiments.

For this reason, please read the manual carefully before installation. This will allow you to get the level of performance required to match your needs.

Scope of this Manual

1.2

This manual is valid for:

All Bruker and OXFORD magnets 200-600 MHz with peripheral devices:
BSMS, B-SN 18, and Sample Changer.

This version of the manual is applicable for the following serial numbers:

Z9523/0001 and higher
Z9524/0006 and higher
Z9525/0011 and higher
Z9526/0012 and higher

For Bruker Sample Transport (BST) with lower serial numbers, Version 1.0 of the manual must be used.

For further technical assistance on the BST, please do not hesitate to contact your nearest BRUKER dealer or contact us directly at:

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Configurations

2

The BST itself is available in two configurations:

A. Basic Version

This is the standard configuration for users without the need for very high tempering gas flows. It is also ideally suited for the operation with a sample changer.

B. Upgraded Version

By installing the optional Upgrade Kit, the tempering gas flows can be significantly increased. This Upgrade Kit may be installed either when ordering the BST, or retrofitted into an already installed system at any time. It also may be deactivated or dismantled any time. When the option is active, it requires the use of the special pressure sealed cover which must be closed after the sample has been inserted into the system. For this reason, the use of the Upgrade Kit is not useful with sample changer operations.

The BST has been designed to closely cooperate with the BSMS. However, it also may be connected to the B-SN 18, using a special cable.

With either the BSMS or B-SN18, the BST may be used with the sample changer, using the appropriate cables.

General Setup Instructions

3.1

When retrofitting the BST, attention must be paid to the following:

- The shim system must be fitted with the new turbine, which has been delivered with all SB shim systems since 1991. When in doubt about the turbine model, please contact the Bruker BioSpin Probe Department.
- In order not to lose the exact position of the shim system, please attach the shim system firmly to the magnet before removing the old shim upper part.

When installing a new system, please make sure you have a shim system with the new turbine. Also observe the correct orientation and position of the shim system.

The BST should be firmly attached to the shim system with the three screws, using a non-magnetic screwdriver.

For all systems, attach the spin (yellow) and lift (white) pneumatic connections. The (large diameter) fitting for the exhaust gas will usually be left unconnected.

NOTICE

The two-way lift valve which was used with the previous model (SUP Type 72) is no longer necessary and is not being delivered with the BST. Therefore, the lift hose should be connected **directly** to the white fitting.

Installation of the Upgrade Kit

3.2

The Upgrade Kit consists of the piston valve and a pressure sealed cover (see **"Upgrade Kit" on page 17**).

To install the option:

1. Remove the blind screw (see **"Basic Version" on page 16**)
2. Insert the piston rod completely into the opening.
3. Screw the screw in until it is flush with the surface of the flange (see **"Setup for Mode 1" on page 18**)

IMPORTANT

Use the non-magnetic screwdriver supplied with the option.

Connecting to the BSMS

3.3

Connect the 8-pin connector with the cable Z12152.

Connecting to the B-SN 18

3.4

Use the adapter cable Z12085 and the 3-pin original cable Z902.

Since the BST uses only a very low lift gas flow, it is mandatory to install a pressure reduction valve (Z4930) before the **inlet** of the B-SN18. This valve must be adjusted for a smooth lift action. For details, see the drawing in **"Configuration with B-SN 18" on page 22.**

Setup with a Sample Changer

3.5

When the BST is being used in conjunction with the sample changer, the information provided by the built-in light barrier in the BST is passed directly (in case of the B-SN 18) or indirectly (via BSMS) to the sample changer. Therefore, the light barrier cylinder used with the shim upper part type 72 is no longer needed.

When using the sample changer with the BSMS, connect the sample changer with the BSMS according to the instructions provided with the BSMS. The electrical connection between the BST and the BSMS is identical to the one described under section **3.3.**

When configuring the BST to a sample changer and B-SN 18, use the adapter cable Z12083, the original cable Z902, and the sample changer cable.

Since the BST uses only a very low lift gas flow, it is mandatory to install a pressure reduction valve Z4930 at the sample changer fitting labeled „LIFT OUT“. The operating pressure of the sample changer should be set to approx. 3 bar. The pressure reduction valve must be adjusted for a smooth lift action. For details, see **"Configuration with Sample Changer" on page 23.**

IMPORTANT

For operation of the sample changer with the Upgrade Kit installed, the screw of the piston valve **must be in the UP** position (see **"Setup for Sample Changer with Upgrade Kit Installed" on page 24.**

Operation

4

Basic Version

4.1

The operation of the basic version is straightforward. The dust cover may be used at the operator's convenience to prevent dust from entering the system.

The achievable tempering gas flow rates are specified on the left side of the table in "**Specifications Table**" on page 26.

Upgraded Version

4.2

A BST equipped with this option may be operated in a number of different ways, depending on the requirements of the experiment. The following sections contain the necessary explanations for the operating modes 1 thru 3. For later reference, the configurations are summed up in "**Operating Matrix**" on page 21.

Mode 1

4.2.1

The piston valve is in the UP position (see "**Setup for Mode 1**" on page 18). The dust cover may be used at the operator's convenience.

In this mode the Upgrade Option is not active and the operation corresponds exactly to the basic version. For further details, see section **4.1**.

IMPORTANT

In this mode (i.e. when not using the pressure sealed cover) it is mandatory for the piston valve to be in the UP position.

Mode 2

4.2.2

The piston valve is in the DOWN position. This is achieved by screwing it in completely (see "**Setup for Mode 2**" on page 19).

Before inserting the sample, make sure that the tempering gas flow is set to a sufficiently low value (e.g. 200l/h). After lowering the sample, close the top of the BST with the pressure sealed cover. Secure it by turning it clockwise. Make sure that the adjusting screw in the pressure sealed cover is completely closed.

Now the required experiments may be performed with tempering gas flows up to the values rated on the right side of the table in "**Specifications Table**" on page **26**.

CAUTION

Before removing the pressure sealed cover, make sure that the tempering gas flow has been reduced to some safe value (e.g. 200 l/h). Failure to do so may cause the sample to be ejected (and possibly broken) the moment the cover is removed.

REMINDER

Once the system has been switched to Mode 2 (by screwing in the piston valve), the pressure sealed cover **must** be used at all times.

Whenever it is desired to revert to operations without the pressure sealed cover (i.e. with the dust cover only or without any cover at all), the piston valve must be placed again in the UP position (see "[Mode 1](#)" on page 11).

Mode 3

4.2.3

This mode is for those experts requiring the utmost tempering gas flow rates, exceeding the capabilities of Mode 2. The operation in Mode 3 is achieved by connecting an external gas supply to the fitting which is part of the pressure sealed cover as shown in "[Setup for Mode 3](#)" on page 20.

This allows to increase the pressure above the spinner by feeding a small gas flow backwards to the system. It is sufficient for the gas supply to be capable of providing several hundred liters per hour with a pressure of less than 0.5 bar.

For doing this, proceed with the following steps:

1. Make sure the piston is in the DOWN position.
2. Insert the sample and secure the pressure sealed cover according to the instructions give under section [4.2.2](#).
3. Start increasing the tempering gas flow through the probe until problems with the lifting-off of the spinner start to manifest.
4. Open slowly the adjusting screw in the pressure sealed cover. Adjust the flow with this screw or with any other external device. This will result in an increase of the gas pressure above the spinner and will ultimately stabilize it.

Nonspinning: Increase the external gas flow until the spinner sits firmly in place.

Spinning: Increase the external gas flow until a proper operation of the spinner is achieved. Too much flow, however, will stop the spinner rotation.

Terminating the experiment:

1. Reduce the tempering gas flow to a safe value (e.g. 200 l/h) or stop it completely.
2. Shut off the external gas supply. Close the adjusting screw in the pressure sealed cover.
3. Now the pressure sealed cover may be removed and the sample ejected.

REMINDER

Before removing the pressure sealed cover, make sure that the tempering gas flow has been reduced to some safe value (e.g. 200 l/h). Failure to do so will cause the sample to be ejected (and possibly broken) the moment the cover is removed.

REMINDER

Once the system has been switched to Mode 3 (by screwing in the piston valve), the pressure sealed cover **must** be used at all times.

Whenever it is desired to revert to operations without the pressure sealed cover (i.e. with the dust cover only or without any cover at all), the piston valve must be placed again in the UP position - see **"Mode 1" on page 11**.

Appendix

5

List of illustrations or specifications in this Appendix:

"Basic Version"

"Upgrade Kit"

"Setup for Mode 1"

"Setup for Mode 2"

"Setup for Mode 3"

"Operating Matrix"

"Configuration with B-SN 18"

"Configuration with Sample Changer"

"Setup for Sample Changer with Upgrade Kit Installed"

"Electrical Wiring Diagram"

"Specifications Table"

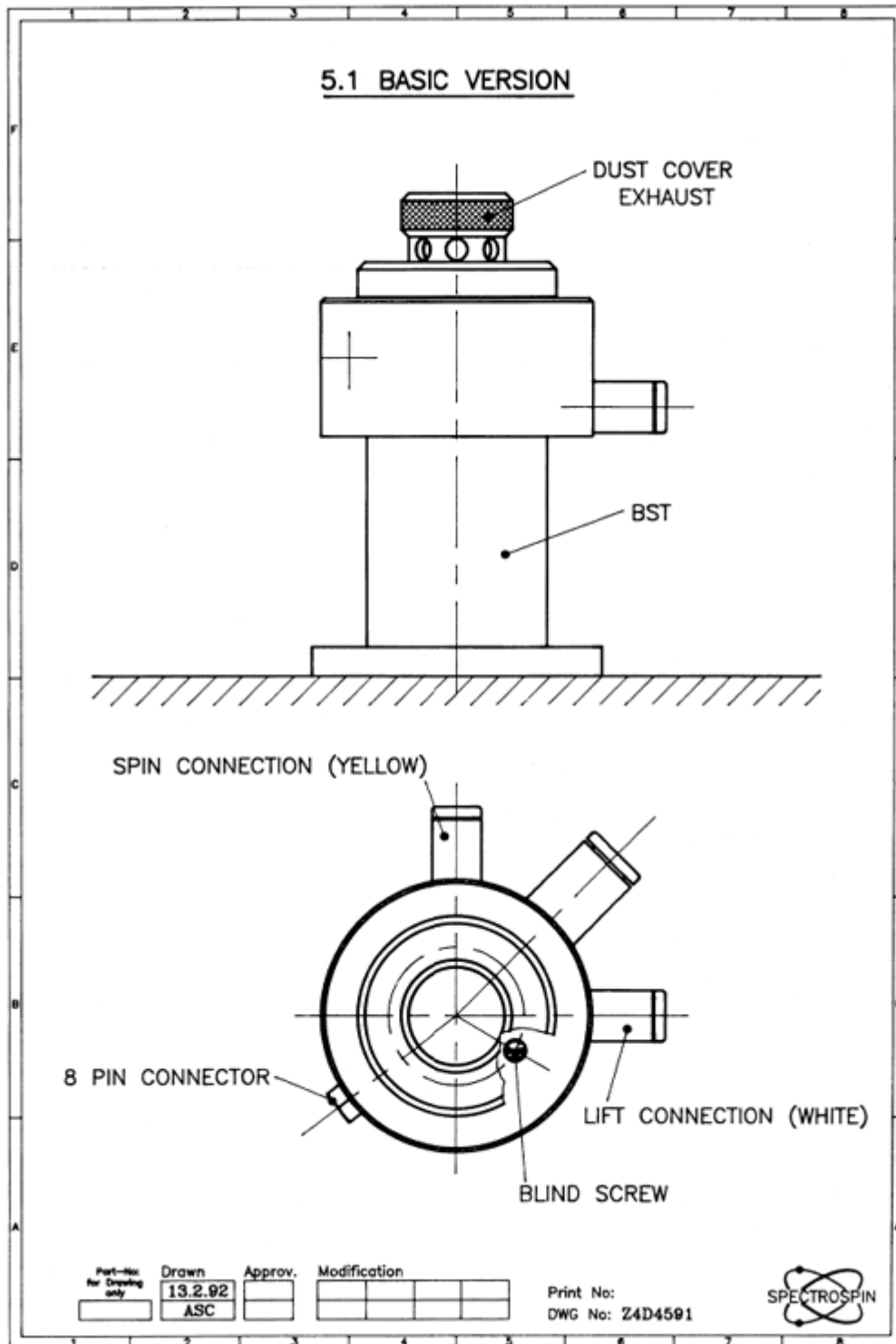


Figure 5.1. Basic Version

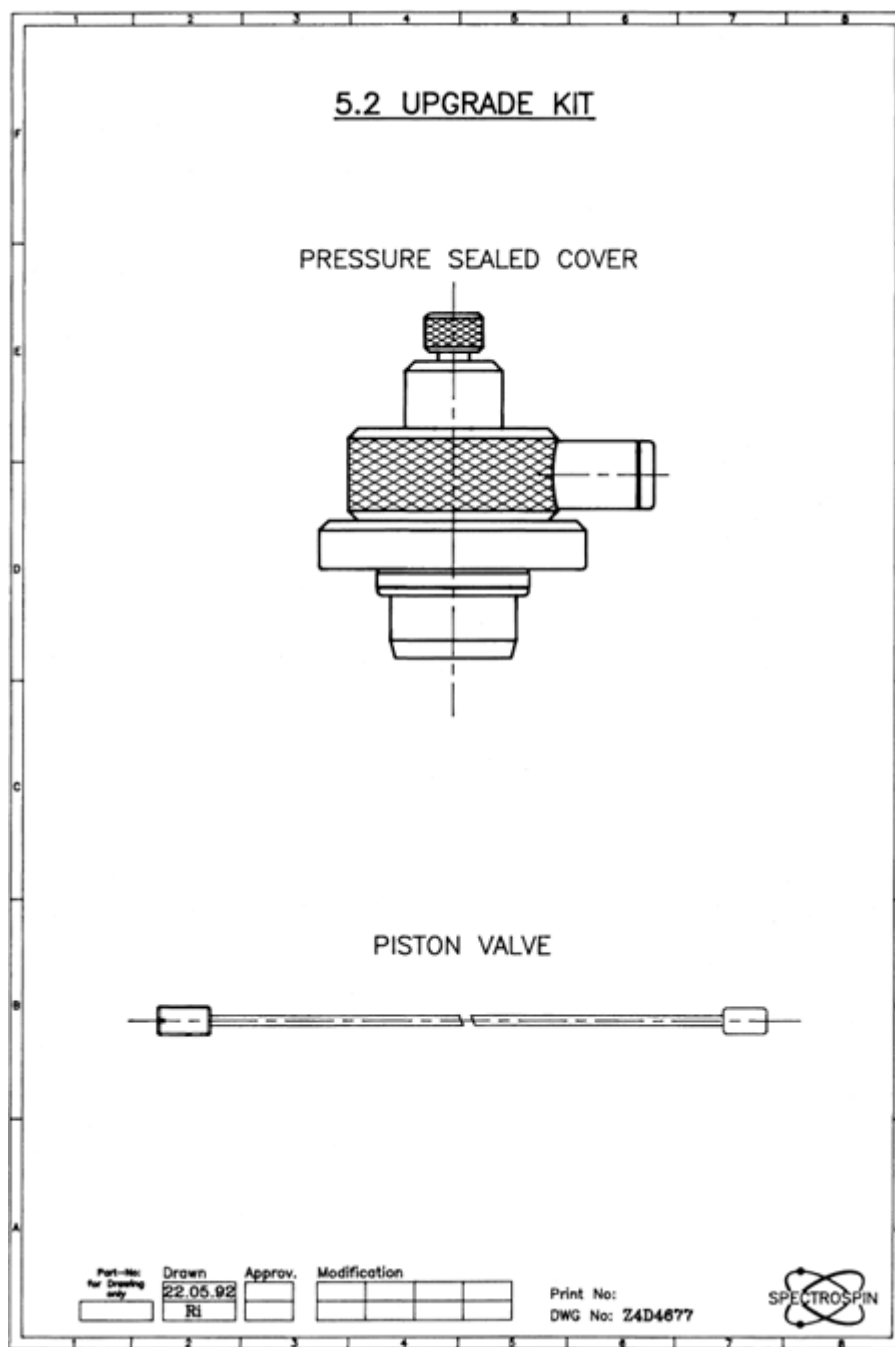


Figure 5.2. Upgrade Kit

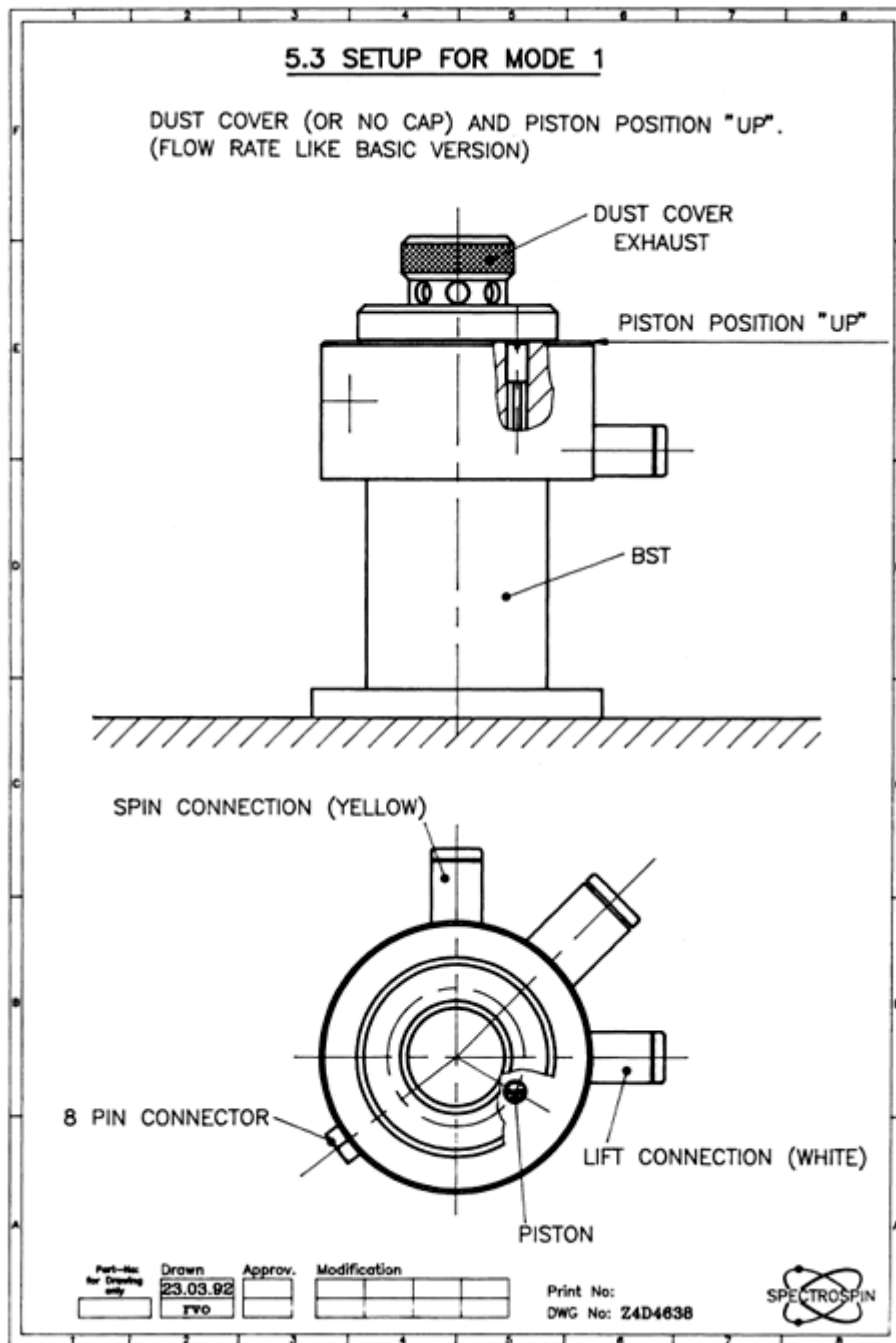


Figure 5.3. Setup for Mode 1

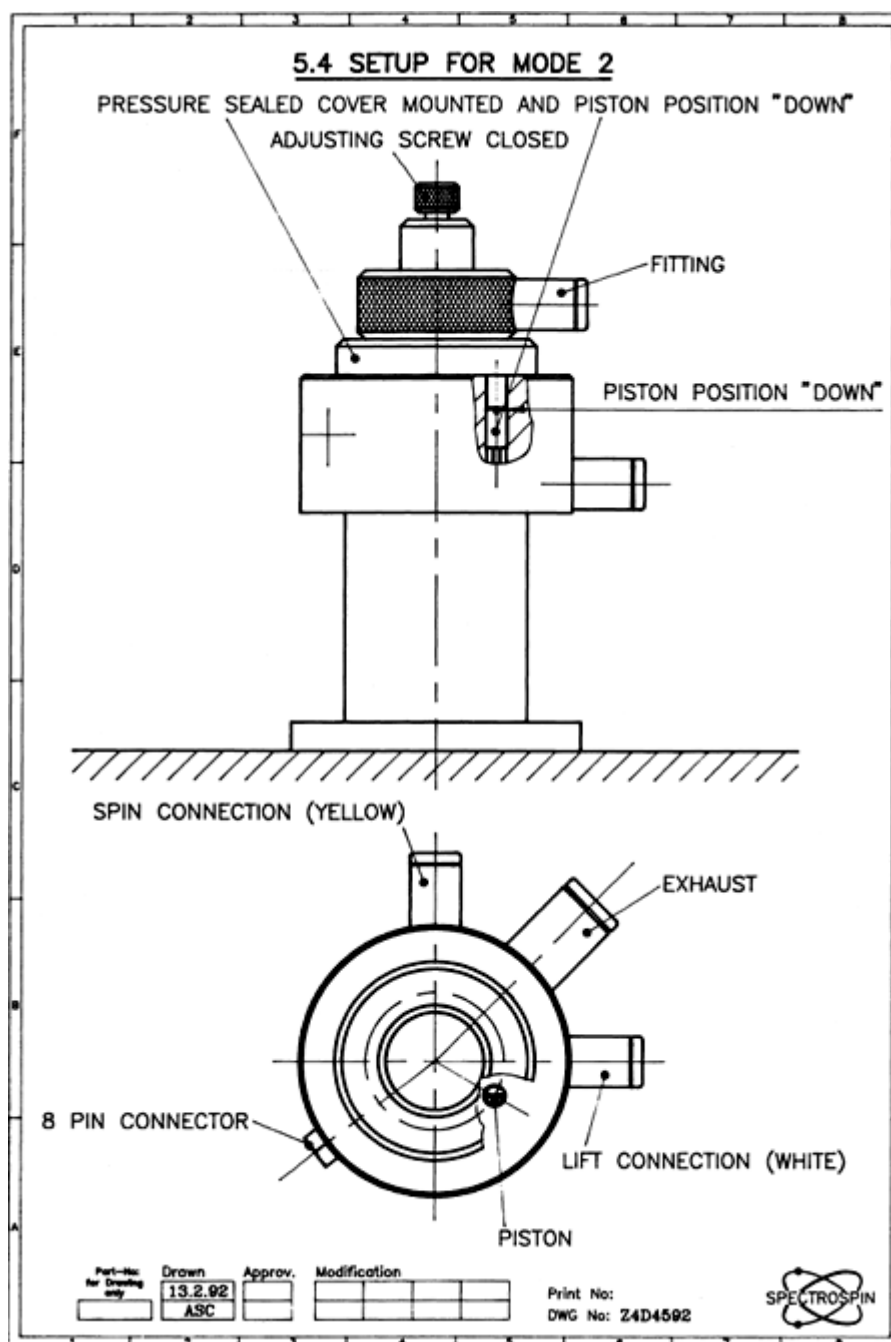


Figure 5.4. Setup for Mode 2

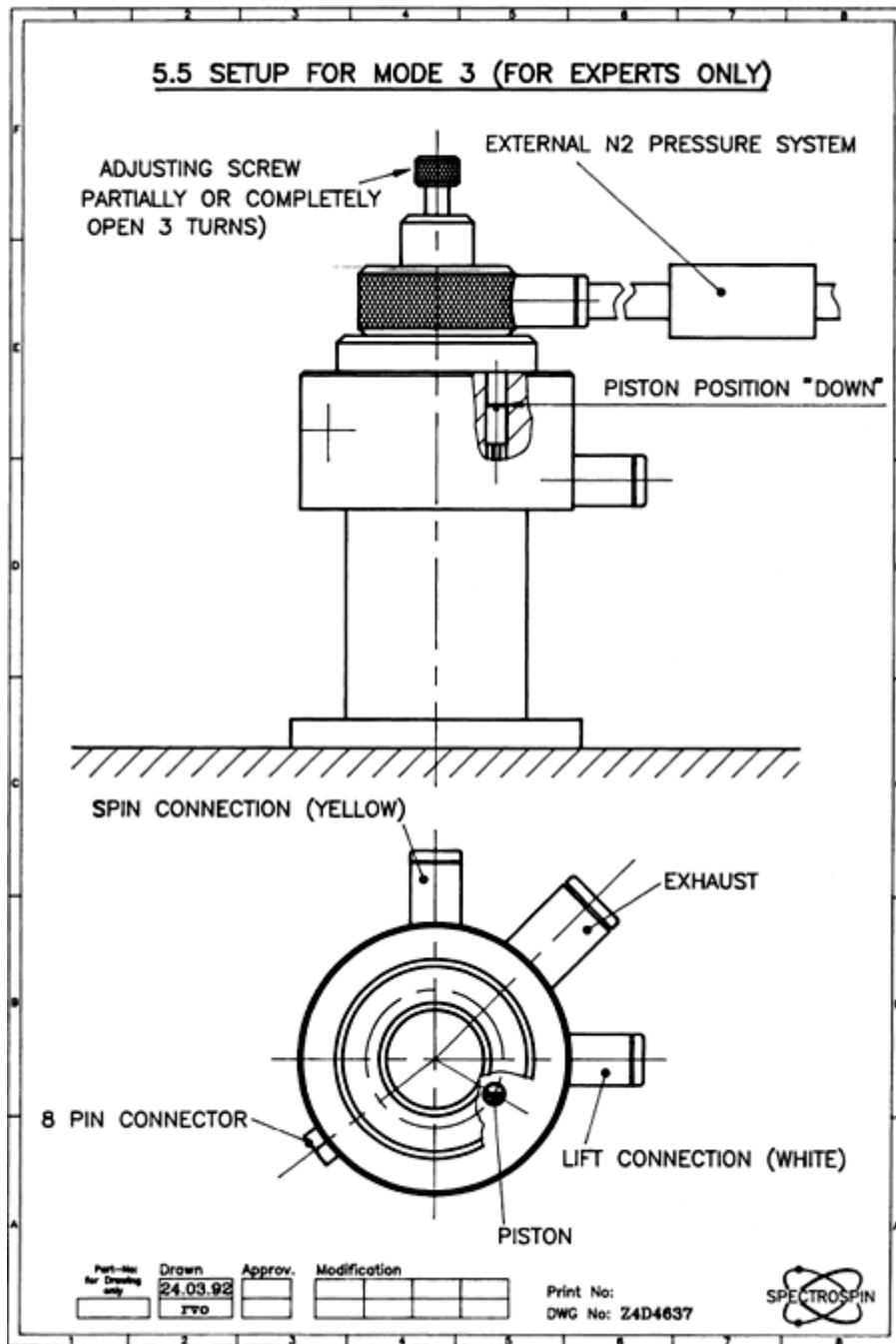




Figure 5.5. Setup for Mode 3

5.6 OPERATING MATRIX

TYPE PISTON	DUSTCOVER OR NO CAP	PRESSURE SEALED COVER ADJUSTING VALVE CLOSED	PRESSURE SEALED COVER EXTERNAL GAS PRESSURE CONNECTED
POSITION "UP" 	MODE 1 OK	NO IMPROVEMENT (COMPARED TO MODE 1)	INEFFICIENT
POSITION "DOWN" 	NOT ALLOWED	MODE 2 OK	MODE 3 OK

Part-Size
for Drawing
only

12.2.92	RAS				
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Print No:
DWG No: 24D4609




Figure 5.6. Operating Matrix

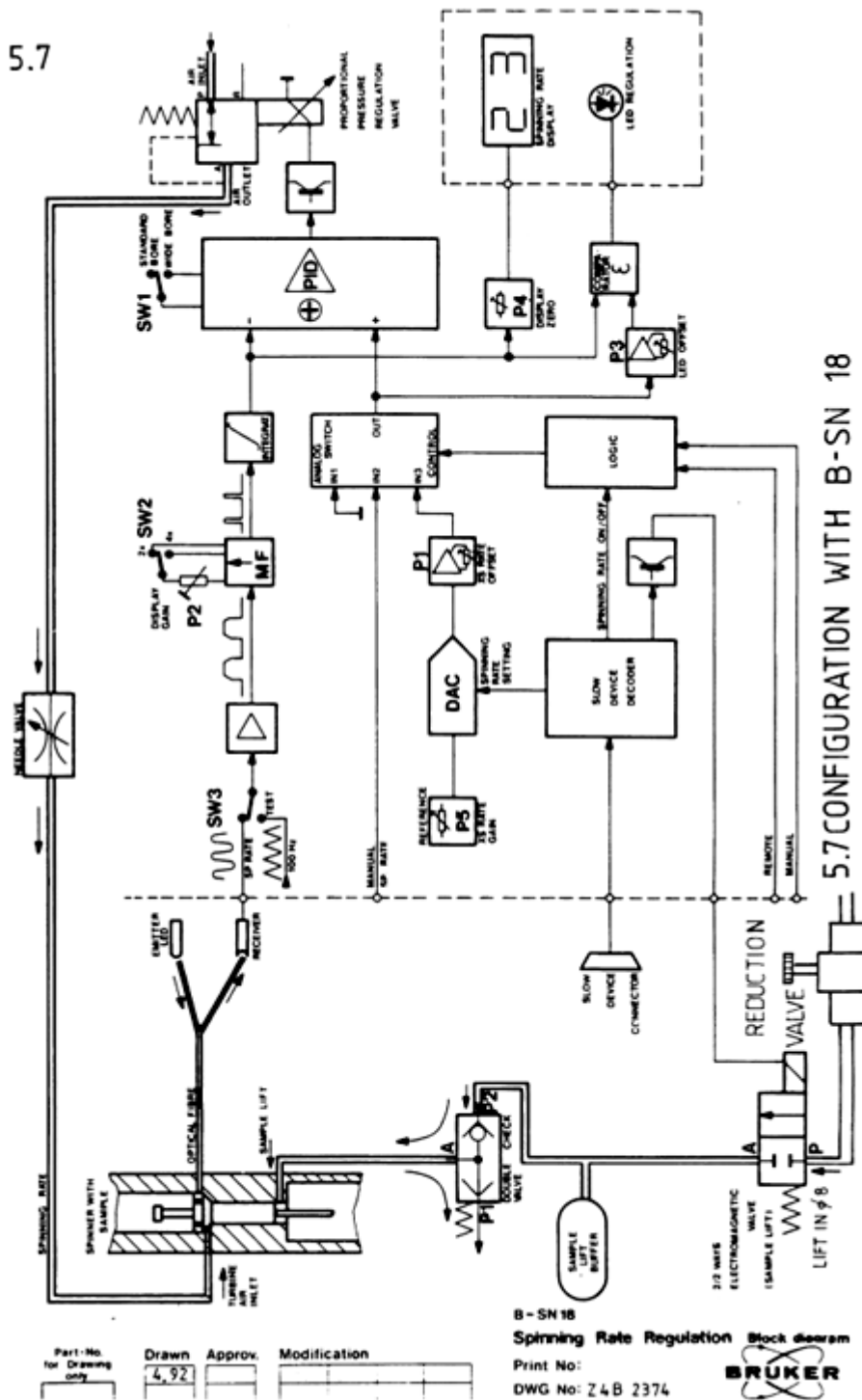


Figure 5.7. Configuration with B-SN 18

Configuration with Sample Changer

5.8

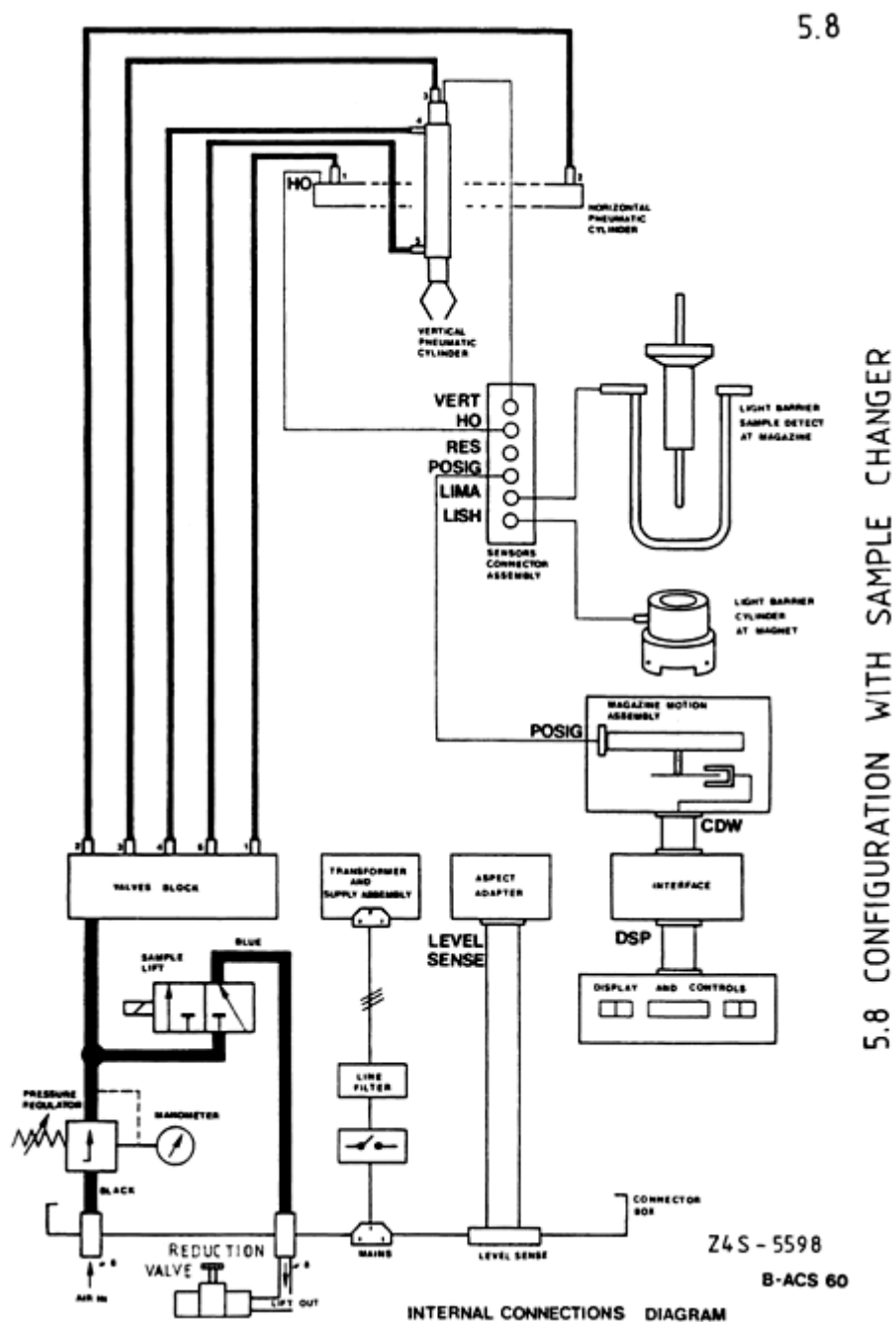


Figure 5.8. Configuration with Sample Changer

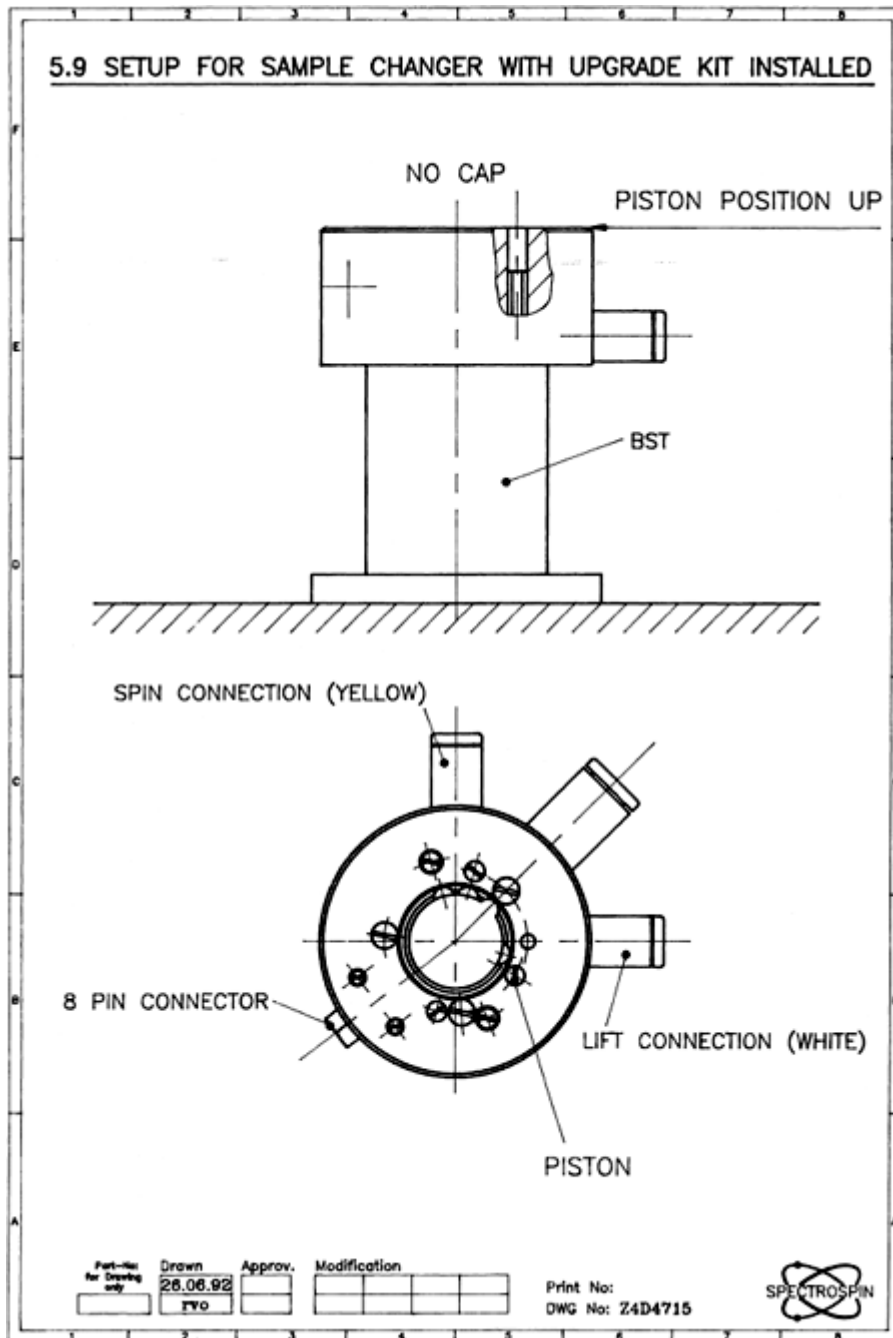


Figure 5.9. Setup for Sample Changer with Upgrade Kit Installed

Electrical Wiring Diagram

5.10

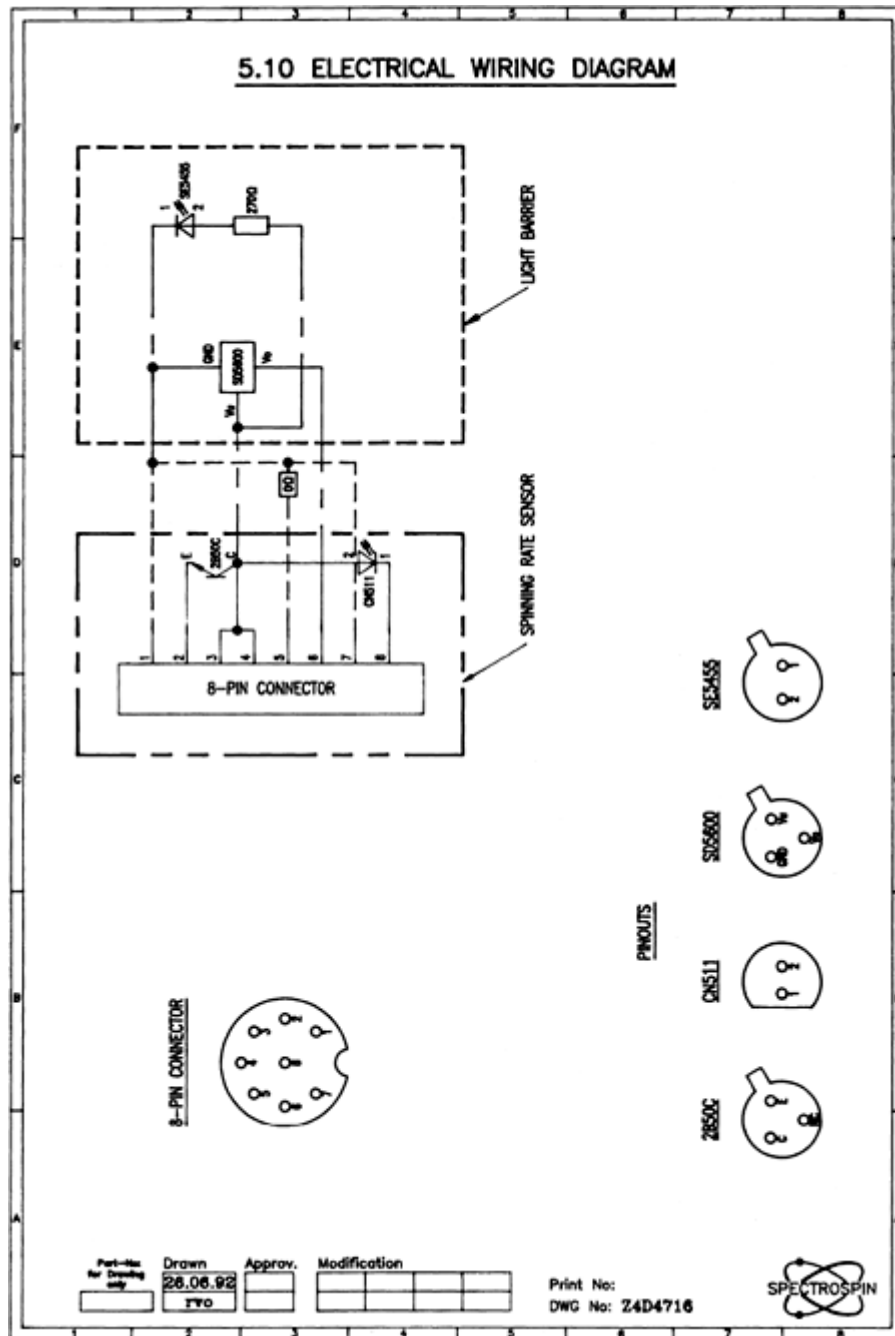


Figure 5.10. Electrical Wiring Diagram

Specifications table for 5 mm Dual Flow Probe:

APPROX .FLOW RATE V [l/h] at 293 K , N2
(FLOW RATE READ AT THE TOP OF THE BALL)

	BASIC VERSION		UPGRADED VERSION	
	spin 20Hz	nonspin	spin 20Hz	nonspin
blue spinner	600	700	1000	800
milky spinner	800	1100	1300	1200
ceramic spinner	1000	1300	1500	1500

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