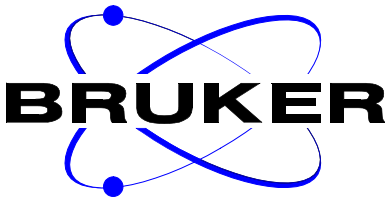

BCU20

Cooling Device
Technical Specifications

Version 001

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This manual describes the units as they are at the time of printing. On request, the manufacturer shall supply circuit diagrams, lists of components, descriptions, calibrating instructions and any other information for use by qualified personnel of the user, in charge of repairing the parts of the unit which have been stated by the manufacturer to be "repairable". Such supply shall in no event constitute permission to modify or repair the units or approval of the same.

This unit is not designed for any type of use which is not specifically described in this manual. Such use may be hazardous.

This manual was written by

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Manual P/N: Z31612
DWG-Nr: 1323.001

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General 1

Introduction 1.1

The **BCU20** (P/N W1210722) is a new cooling device for the BRUKER micro-imaging probes. A chiller with a gas compressor cools a water bath whose temperature is regulated by a temperature controller. A circulating pump feeds continuously the probe with coolant.

The temperature sensor for temperature control can be selected by switch, it is either the sensor located inside the probe or an internal sensor that measures the bath temperature in the **BCU20**.

The target temperature setting is done on the host computer via a serial link in the XWinNmr program or on the keypad of the temperature controller.

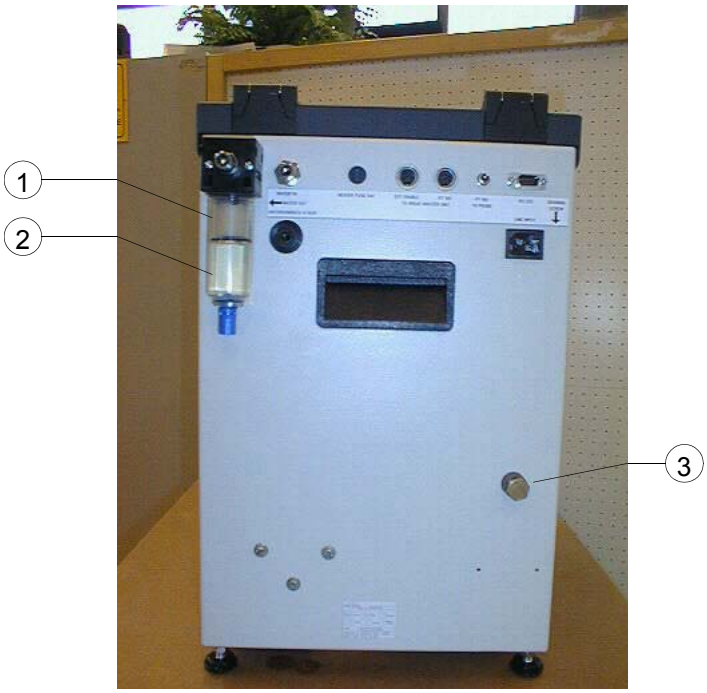
The sensor's temperature is always indicated on the temperature controller display.

Description *1.2*

Figure 1.1. ***BCU20*** *Front view*

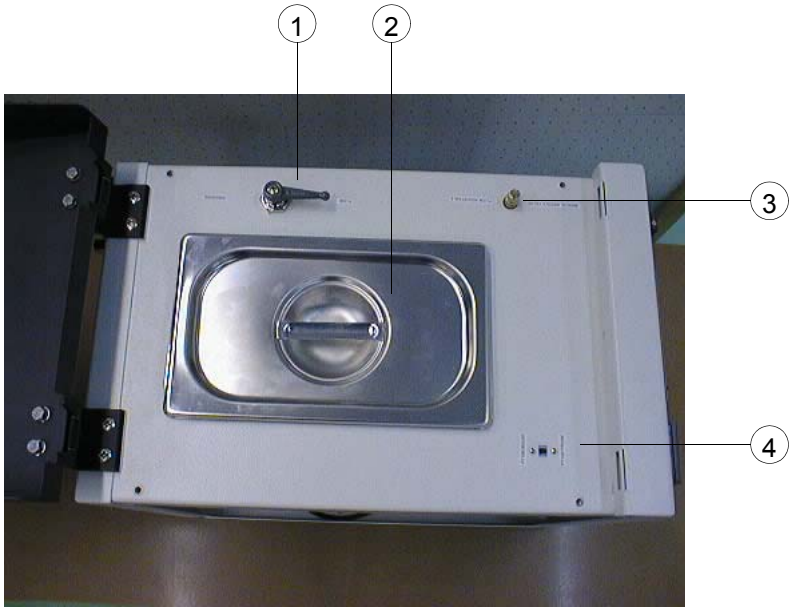
1. **Temperature controller**
   PN : 75703
2. **Red warning light**
   PN : 32507
3. **Switch ON/OFF**
   PN : 75893
4. **Green LED PN : 375**
   + Support PN : 2534
5. **Flowmeter**
   PN : 30515

Figure 1.2. ***BCU20*** *Rear view*



1. **Filter element**
   PN : 68443
2. **Filter 1/8 ” Plastic**
   PN : 68318
3. **Cap 1/4 ”**
   PN : 10204

Figure 1.3. Tank top view

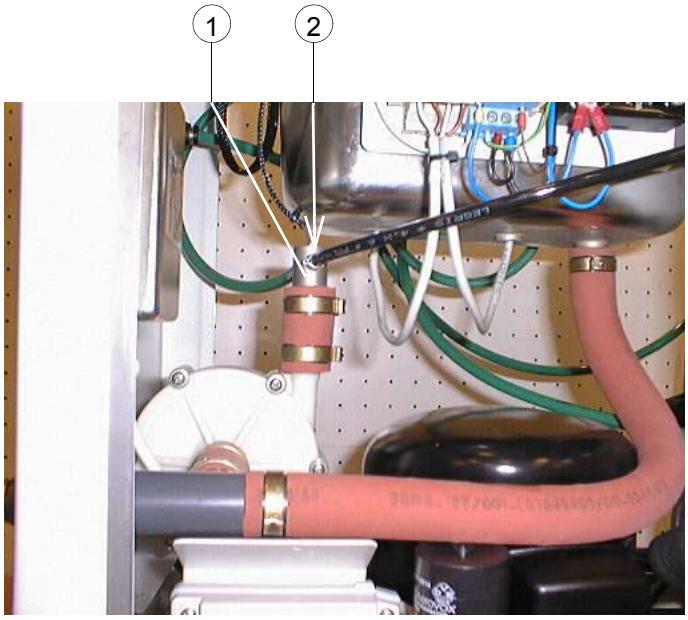


1. **3 Way valve**
   PN : 34226
2. **Tank cover**
   PN : 75685
3. **Manual needle valve**
   PN : 34548
4. **Switch** (PT100 selection)
   PN : 75760

Figure 1.4. Tank inner view

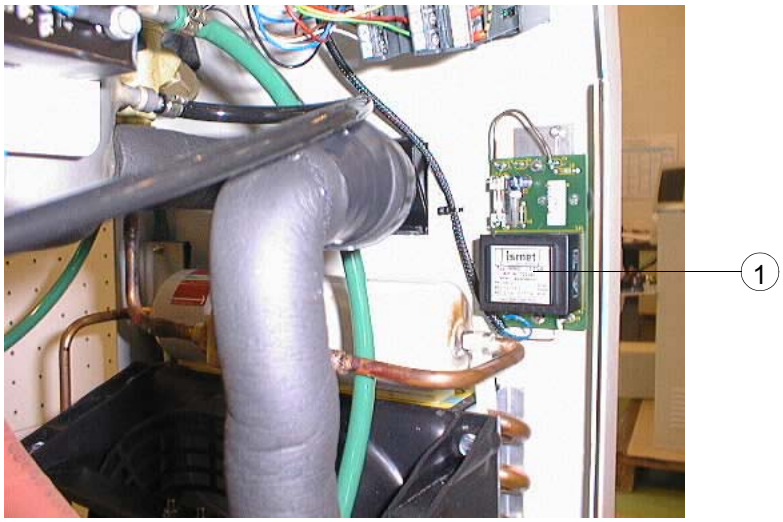
1. **Level switch**
   PN : 77076

Figure 1.5. Internal PT100 sensor



1. **Pump nozzle**
   PN : W1210467
2. **Internal PT100 sensor**
   PN : W1211648

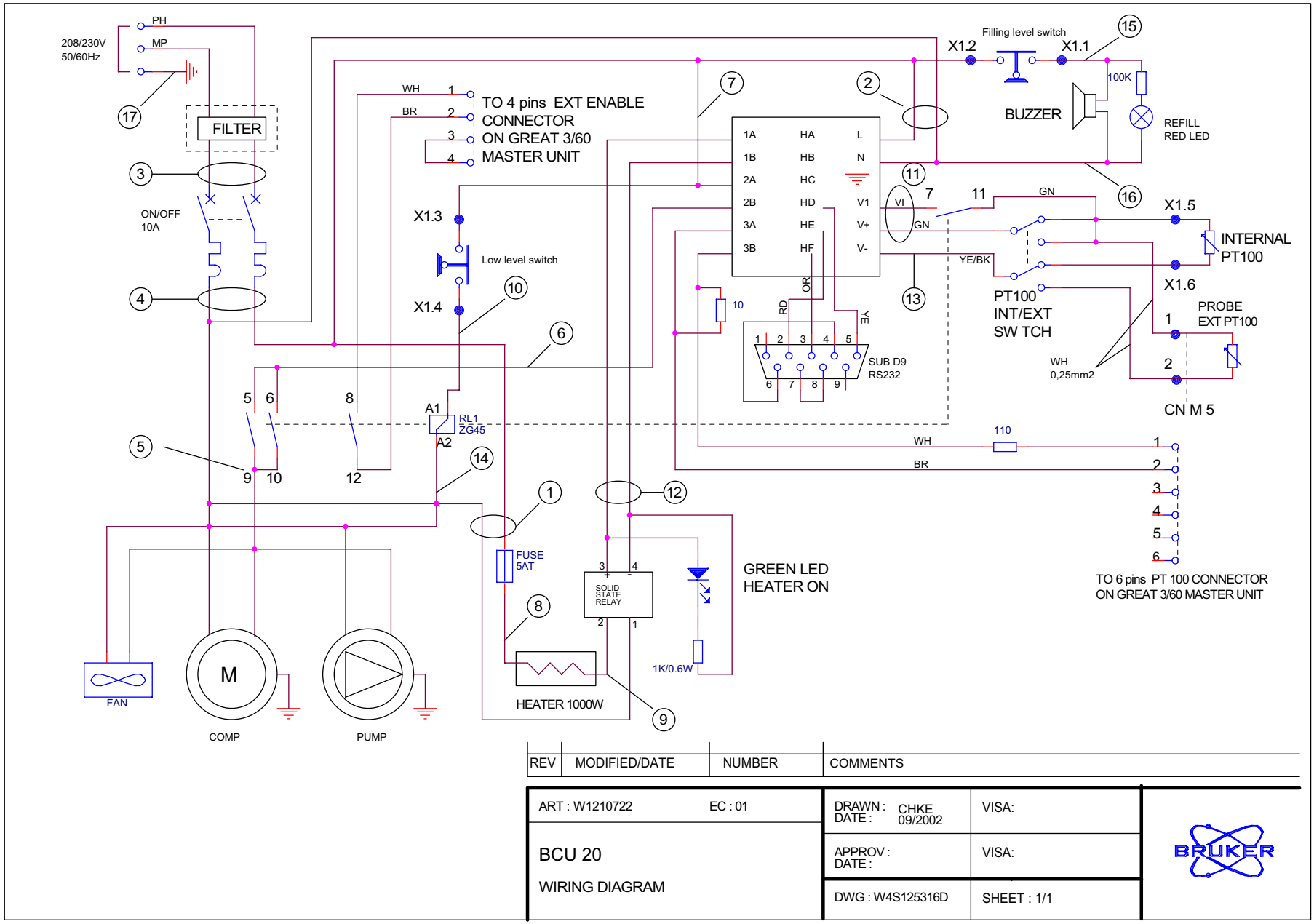
Figure 1.6. Level switch assembly



1. **Level switch with buzzer**
   PN : W1209196

Figure 1.7. BCU20 with cables

1. **Green 8/5.5 mm hose**
   PN : W1210266
2. **Black HDPE 8/6 mm hose**
   PN : W1211318
3. **External Enable Master cable**
   PN : W1211017
4. **PT100 Master Unit Connection**
   PN : W1211022
5. **Filter element**
   PN : 68443
6. **Power cord**
   PN : 33003
7. **RS232 cable**
   PN : HZ04053
8. **Demineralized water 5 litre**
   PN : 77174

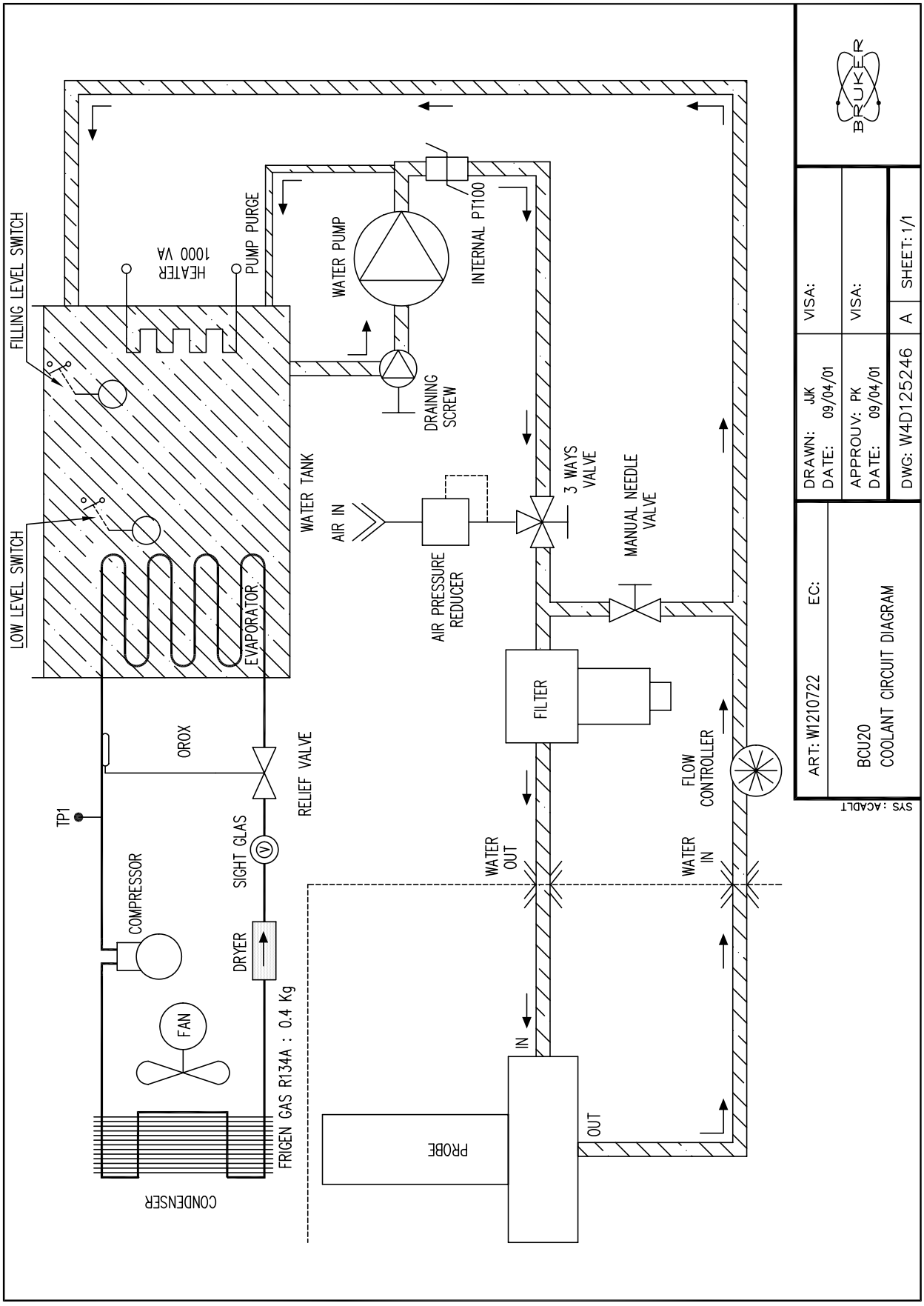


REV	MODIFIED/DATE	NUMBER	COMMENTS

ART : W1210722 EC : 01	DRAWN : CHKE DATE : 09/2002	VISA:	BRUKER
BCU 20 WIRING DIAGRAM	APPROV : DATE :	VISA:	
	DWG : W4S125316D	SHEET : 1/1	

Figure 1.8. BCU20 Wiring diagram

Figure 1.9. Coolant circuit diagram



General specifications *1.3*

Coolant temperature control range	+5 to 50 °C (230V - 10% / 50Hz) +5 to 50 °C (230V - 0% / +10% / 60Hz) +5 to 35 °C (218V - 0% / +10% / 60Hz)
Temperature stability	+/- 0.1 °C (with internal sensor selected)
Coolant	demineralized water 3 litres
Coolant flow rate	0.2 to 1 l/min (adjustable by a manual needle valve, flow indicator on front panel)
Circulating pump for coolant	0.3 bar max. pressure
Temperature sensor	Pt100 in probe or bath, selectable by switch
Cooling power	250 Watt at 20 °C bath temperature
Compressor gas capacity	0.4 kg R134A gas
System operating temperature	15 to 32 °C
Draining gas requirement	air 4-6 bar, the draining pressure is factory set to 0.3 bar by an internal pressure regulator
Input voltage, AC	230V (- 5% / +10%) 50 / 60 Hz
Power consumption	1300 VA max.

Weight	40 kg
Dimensions	570 (w) x 306 (l) x 490 (h) mm
Electrical Safety Testing	Compliant with C15100 et EN61010
Electromagnetic Compatibility (EMC)	Compliant with EN55011 et CEI801
Included with instrument	- 2 x 6 meter 8 mm plastic hose for probe connection - power cord

BCU20 Installation 1.4

The **BCU20** must be installed at a minimal distance from the magnet. The stray magnetic field must be less than 1mT. See the stray magnetic field plot of the magnet to find out the minimal distance.

Connect the two hoses on the **BCU20** and on the quick fittings of the probe.

The probe temperature sensor cable must be connected (otherwise the controller display indicates «SBr», which means sensor wire break or sensor not connected).

The air supply must be connected (necessary for the draining of the probe, inlet pressure 4-6 bar).

The cable (P/N W1211017) must be connected to the GREAT MASTER UNIT (GMU) to the plug «External enable connector».

The cable (P/N W1211022) must be connected to the GMU in the plug «Pt100 connector».

The RS232 interface cable is plugged in the RS232 dispatcher of the spectrometer.

WARNING: Before filling or removing coolant from BCU20, remove always power cord from unit to avoid an electrical shock.

Coolant circuit 1.5

The power switch starts the circulating pump when the water level is correct.
A low water level is indicated by a continuous buzzer tone and a red led on front side panel.

Filling 1.6

The tank must be filled with approximately 3 litre of distilled water. Fill the tank until the water level reaches the high level mark.

Check the valve position, it must be on «FLOW» and the manual needle valve, near the tank, must be completely open (turn counter clockwise).

Power on the **BCU20** unit, the pump and the gas compressor are now switched on. After a few minutes check the water level and refill the tank if necessary.

After a few minutes, the time necessary to evacuate the bubbles in the pump, close the needle valve. The flow indicator should indicate a high flow rate.

The coolant flow rate in the probe can be adjusted with that valve. When the needle valve is closed the flow rate is maximal through the probe.

Coolant replacement 1.7

Remove the electrical power cord of the unit.

Place a container for the water behind the **BCU20** (3 litre volume minimal)

Remove the cap located on the rear panel under the power supply plug.

Wait until the tank is empty and close the cap again.

Maintenance 1.8

Check the appearance of the coolant once a week. The liquid must be clear and colorless, otherwise it must be replaced.

A filter for the coolant is located on the rear panel to prevent the clogging of the probe. When the flow rate decreases the filter must be replaced by a new filter (Bruker P/N 68443).

The filter should be replaced every 6 months.

Probe dismounting 1.9

The probe must be drained before dismounting.

Power off the **BCU20** and turn the valve located near the tank in the "draining" position. The tank cap must be placed over the bath to avoid water splashing. Wait a few minutes until you hear a continuous bubbling in the tank. During that time, draining of the probe is carried out.

Turn then the valve in position « FLOW » again.

Disconnect now the hoses from the probe.

Safeties 1.10

A low water level in the tank is indicated by a led on the front panel and a buzzer sound.

A second safety water level sensor shuts down the pump and the gas compressor whenever the water level is too low in the tank.

In this event the software gets an error message "SBR" from the temperature controller (blinking «Sensor break» message). The operator must check the water level in the tank and refill the tank. The message can also indicate a failure of the Pt100 sensor or a disconnected sensor cable.

The bath water heater protected by a fuse (fuse on rear panel).

The **BCU20** is connected to the «Great Master Unit (GMU)» with two cables. One cable serves to enable the GMU when the **BCU20** is powered on. A safety relay disables the GMU when the **BCU20** is in error (water level to low in water tank).

The second cable disables the GMU when the sensor temperature is higher then 50 °C.

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