Transaction Information

Tool ID	MAL2205
Tool Status	Disconnected
Location	Malta, USA
Wafer Size	NA
Fab Section	Failure Analysis
Tool Available Date	2024-08-27

General Product Information

Vendor Supplier	BRUKER
Model	D8 Davinci
Vintage	2013
Serial No	12/12-113
Asset Description	Bruker D8 DaVinci X-Ray Diffractometer
Software Version	Windows 7
CIM	NA
Process	XRD

Hardware Configuration (Fab)

System Type	Description	Quantity	Status
Options System	NA		

Hardware Configuration (Subfab / Auxilliary Units)

Description	Quantity	Status
NA		

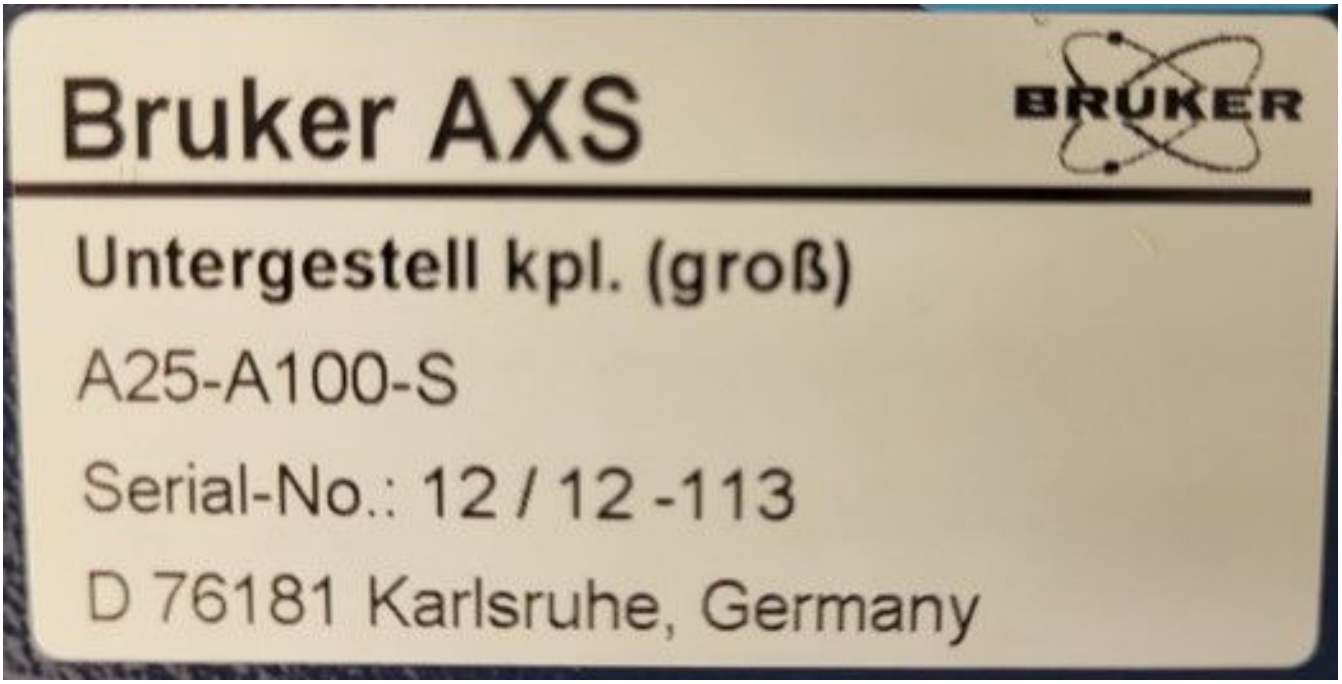
Missing/Faulty Parts / Accesorries List

Description	Quantity
NA	

Tool Pictures

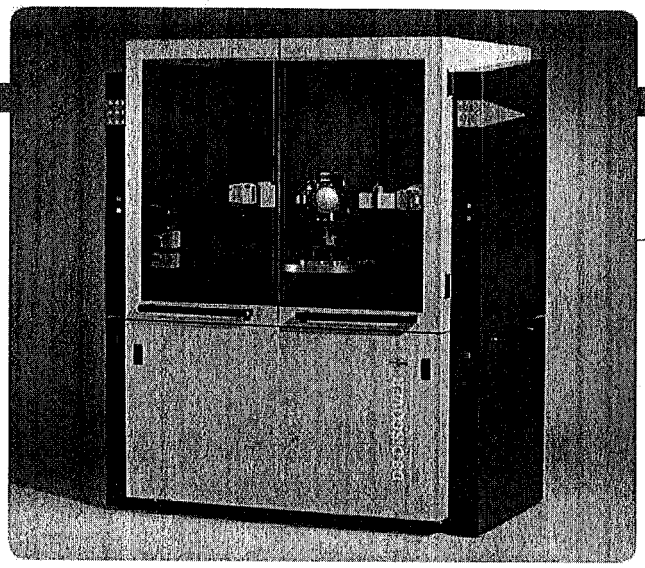
General	MAL2205 Bruker D8 DaVinci XRD

Manufacture Serial	MAL2205 Bruker D8 DaVinci XRD serial



Additional Tool Data Files

Bruker AXS



D8 DISCOVER
with DAVINCI.DESIGN
Pre-installation Guide
(For installations in North America)

Purpose

This Pre-installation Guide will aid you and any required personnel in site preparation prior to installation of the system.

Read these instructions carefully and thoroughly to prepare for installation of the system. Proper site planning will ensure optimum efficiency, maintenance access, proper instrument performance, and avoidance of unnecessary delays during installation.

Responsibility

The customer is responsible for making certain that the basic site requirements for the system are fulfilled. These instructions are to be followed by the customer and by customer-contracted tradespeople, except where otherwise noted.

System Requirements

The following specifications are general system requirements. Use this information to make an initial determination on the suitability of your proposed site. Refer to later sections of this Pre-installation Guide for more details.

Pre-installation overview

Power	
208-240 VAC, 50/60 Hz, 1-phase, (2) 40 A fuses/ breakers	K430 X-ray generator, Enclosure controller and goniometer control electronics
208-230 VAC, 60 Hz, 1-phase, 15 A fuse	Haskris R100C water recirculator
110-220 VAC, 50/60 Hz, 1-phase, 15 A fuse	Frame buffer PC (powered from the in-house mains system)

Cooling Water	
Cooling capacity	3850 W (13125 btu/hr) or greater
Temperature	10° - 20° C ± 1° C (50° - 68° F ± 2° F)
Pressure	4 - 6 bar (60 - 90 psi)
Quantity*	23.0 l (6 gal)

*Quantity specified is for Haskris R100C. Use distilled water.

Communications	
RJ-11 Telephone line	Voice connection near instrument
RJ-45 (Ethernet) Network connection	Remote diagnosis over the internet

Radiation Safety

Radiation safety can be separated into two categories:

- **Instrument:** Bruker AXS is authorized to provide installation, service, and preventive maintenance of all Bruker analytical X-ray systems. Bruker AXS is also authorized to provide training and consultation on these systems' operation and safety features.
- **State, Province, and/or Commonwealth:** Bruker AXS is NOT authorized—and is strictly forbidden—to provide consultation services regarding your local state, province, and/or commonwealth regulatory requirements.

  You, as the customer, are required to contact the agency in your state or province that regulates the X-ray instrument's registration, receipt, and/or use (i.e., your local state or province may or may not require you to have a Radiation Safety Officer on-site, use standard operating procedures, use dosimetry badges, conduct an annual radiation check, etc.).

If you have any questions, please do not hesitate to call Bruker AXS at 1 (800) 234-XRAY [9729] and ask to speak with the Radiation Safety Officer. Be aware that the Radiation Safety Officer's advice may be limited or incomplete due to state, province, and/or commonwealth regulatory restrictions.

Dimensions and Weights

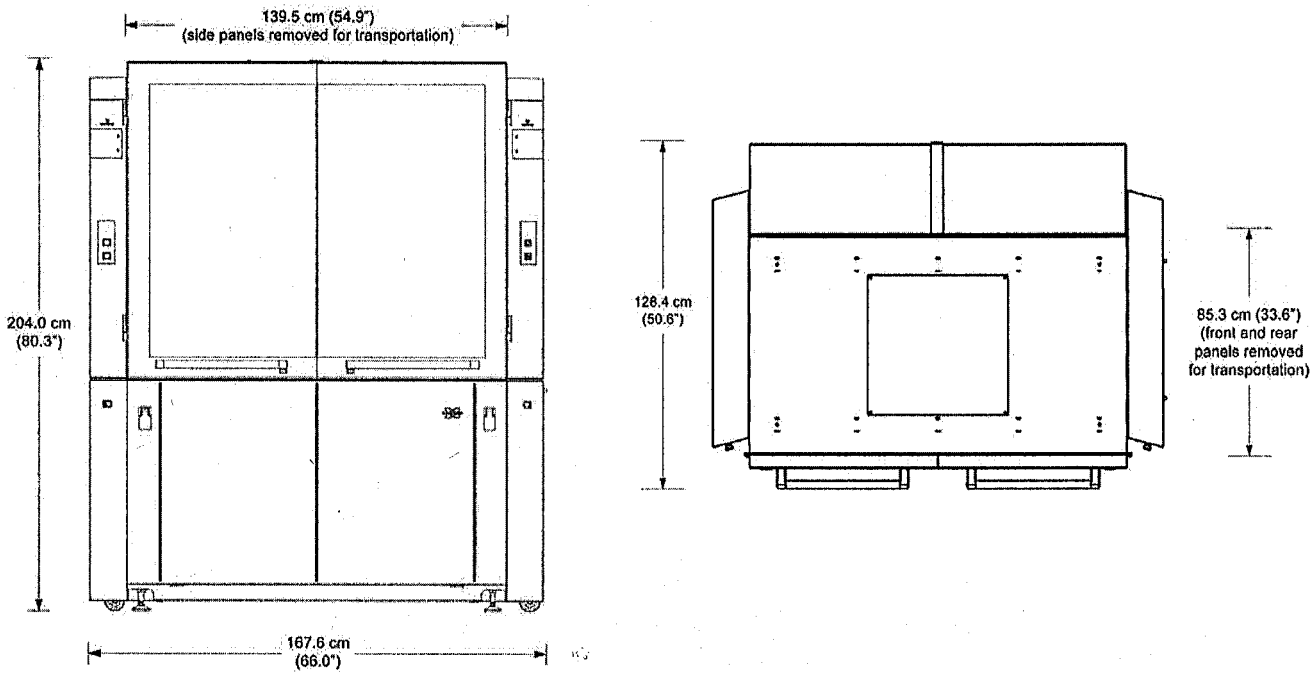
X-ray Enclosure Dimensions

The system is equipped with integrated casters for easier transportation inside the laboratory. Side, rear, and front panels can be removed for moving the system through doors. The upper enclosure may be detached from the base cabinet for transport. The enclosure and base cabinet are connected mechanically (i.e., with screws) and electrically. Electrical and mechanical connections must be separated before attempting to detach the upper enclosure and base cabinet.

Table 1. Installed dimensions

Installed Dimensions		
Height	204.0 cm (80.3")	
Width	167.6 cm (66.0")	139.5 cm (54.9") if side panels are removed for transportation
Depth	128.4 cm (50.6")	85.3 cm (33.6") if front and rear panels are removed for transportation

Figure 1. X-ray enclosure dimensions



D8 DISCOVER System Weight

Table 2. D8 DISCOVER system weight

D8 DISCOVER System Weight	
Weight of complete system ready for operation	Approx. 980 kg (2161 lbs)
Floor load capacity	1100 kg/m^2 (225.3 lbs/ft^2) minimum. The floor should be level and as rigid as possible to avoid vibration.

Environment Requirements

Table 3. Environment requirements

Room/Instrument	Requirements
Room operation-range temperature	Maximum: 15.0° - 35.0° C (59.0° - 95.0° F) Recommended: 20.0° - 28.0° C (68.0° - 82.4° F) Avoid direct sunlight.
Maximum temperature gradient	1.0° C (1.8° F) per hour
Relative humidity	20% - 80%, condensation not allowed
Wall-to-instrument-rear clearance	70.0 cm (27.6") recommended. Although the instrument has wheels, it should be accessible from all sides for proper servicing and airflow.
Heat dissipation to the air (instrument)	Dissipated heat must be removed by a ventilation or air-cooling system. Cooling air should flow around the instrument without restriction. If possible, locate the air conditioning and heating ducts so that their airflow is not aimed directly at the instrument. We recommend a clean, dust-free environment.
Heat dissipation to the air (water recirculator)	To avoid heat near the diffractometer, the water recirculator should be installed in a separate room. If the water recirculator is installed in a closed room, ensure that the waste heat is carried away and fresh air is supplied.
Static electricity elimination (to avoid adverse effects on instrument electronics)	Any carpeting in the area should be conductive. If the area is carpeted with non-conductive carpet, we recommend that you place anti-static mats over the conventional carpeting in the area around the instrument.

Figure 2. Typical D8 DISCOVER floor plan

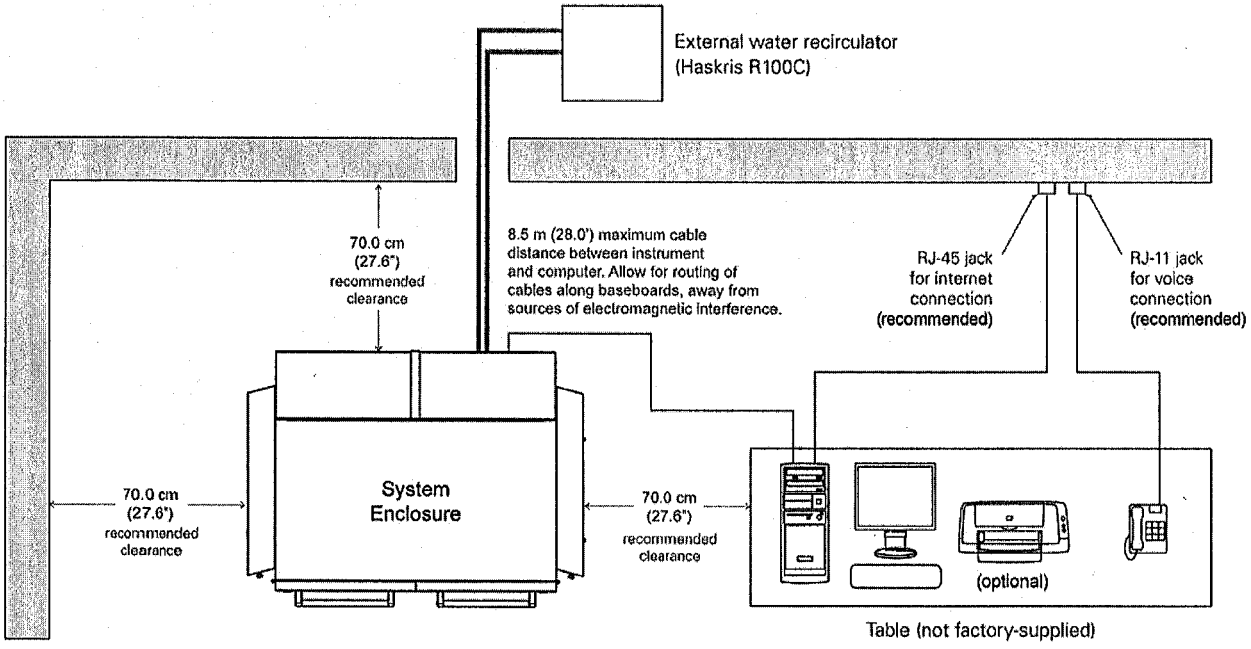


Table 4. D8 DISCOVER components' heat dissipation to air

Component	Heat Dissipation to Air
K430 X-ray generator	500 W (1706 btu/hr) to air at full load 3500 W (11942 btu/hr) to water at full load
Enclosure controller and goniometer control electronics	Max. 800 W (2730 btu/hr)
Haskris R100C water recirculator (installed in a separate room)	Water-to-air: 3000 W (10200 btu/hr) Water-to-water: negligible
Frame buffer PC	Max. 165 W (563 btu/hr)

Air Quality and High-Precision Optics

The system uses many high-precision optical devices that may be exposed to harmful environmental conditions. Generation of ozone near the optics' surface by the X-ray beam can cause chemical reactions with contaminants in the air. The end products of these reactions may result in degradation of the optics' performance. Therefore, clean laboratory conditions and prevention of water condensation at the head of the X-ray tube and the optics housing are highly recommended. The cooling water's temperature must be high enough to avoid condensation. Avoid continuous water flow while the generator power is switched off.

Despite these precautions, it may be necessary to periodically clean the optics. Contact Bruker AXS for support.

Communication Requirements

Table 5. Communication requirements

Connection	Connector	Purpose
Telephone line (recommended)	RJ-11	Voice connection near instrument
Network connection (recommended)	RJ-45 (Ethernet)	Remote diagnosis over the internet

NOTE: Bruker AXS' Remote Diagnosis features are now available over the internet (i.e., WebEx). Check with your IT administrator to find out how Remote Diagnosis may affect your IT policy.

Electrical Requirements

- Use the supplied power cable to connect the instrument. See Table 6 for power requirements (including the computer and peripherals).

NOTE: If the power line voltage at your site fluctuates outside the values in Table 6, a compatible line voltage conditioner or regulator may be necessary. Check with your site's electrical coordinator.

- On the wall behind the instrument, connect power from the building mains to a labeled direct-wired circuit breaker/disconnect box so that power to the instrument can be interrupted if necessary.
- Wire the room air conditioner and any external pumps to a different electrical circuit than that used for the instrument. High starting currents from their motors may adversely affect line voltage stability. Additionally, provide a separate electrical power circuit for the Haskris R100C water recirculator.
- To limit electrical noise in the system, connect the system chassis ground to an external grounding terminal. Note that only the instrument can use this ground, and the ground resistance must not exceed 0.5 ohm. For optimum performance, make this connection within 12' (3.7 m) of the rear of the instrument.
- If the supply neutral is grounded, it should have the same potential as the earth point on the instrument.

Table 6. D8 DISCOVER electrical requirements

Service Required	Component(s) Using the Service	Voltage	Frequency	Phases	Current Draw
208-240 VAC, 50/60 Hz, 1-phase, (2) 40 A fuses/ breakers [1,2,3]	K430 X-ray generator	180-250 VAC	50/60 Hz	1-phase	21 A
	Enclosure controller and goniometer control electronics	208-240 VAC	50/60 Hz	1-phase	3 A
208-230 VAC, 60 Hz, 1-phase, 15 A fuse	Haskris R100C water recirculator	208-230 VAC	60 Hz	1-phase	15 A
110-220 VAC, 50/60 Hz, 1-phase, 15 A fuse [3]	Frame buffer PC (powered from the in-house mains system)	110-220 VAC	50/60 Hz	1-phase	15 A

[1] If fuses are used, use slow-blow fuses.

[2] Additional accessories will require additional power.

[3] Customer to supply plug or shut-off box.

Figure 3. D8 DISCOVER recommended electrical connections

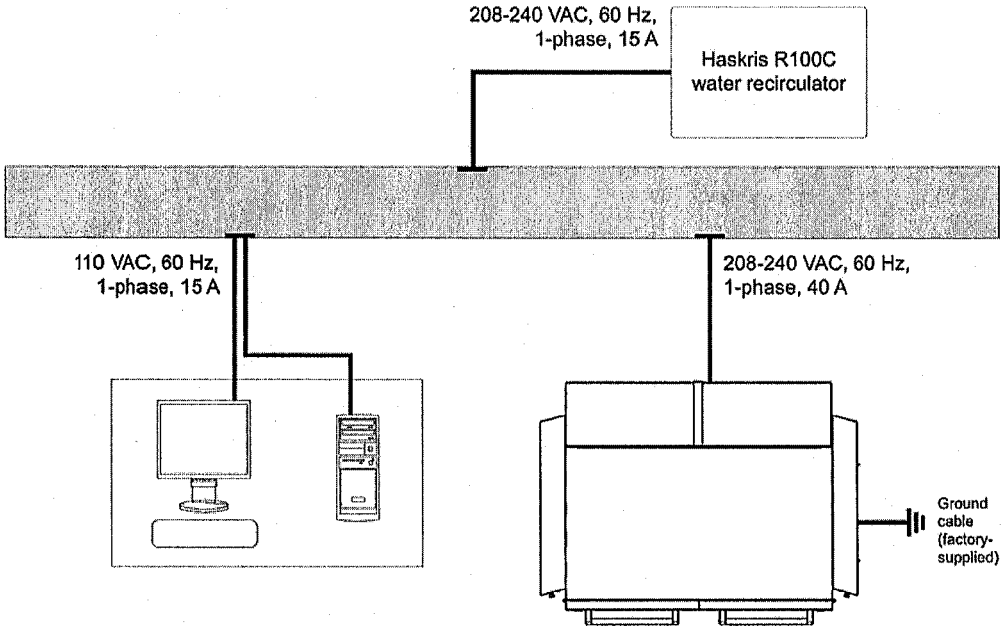
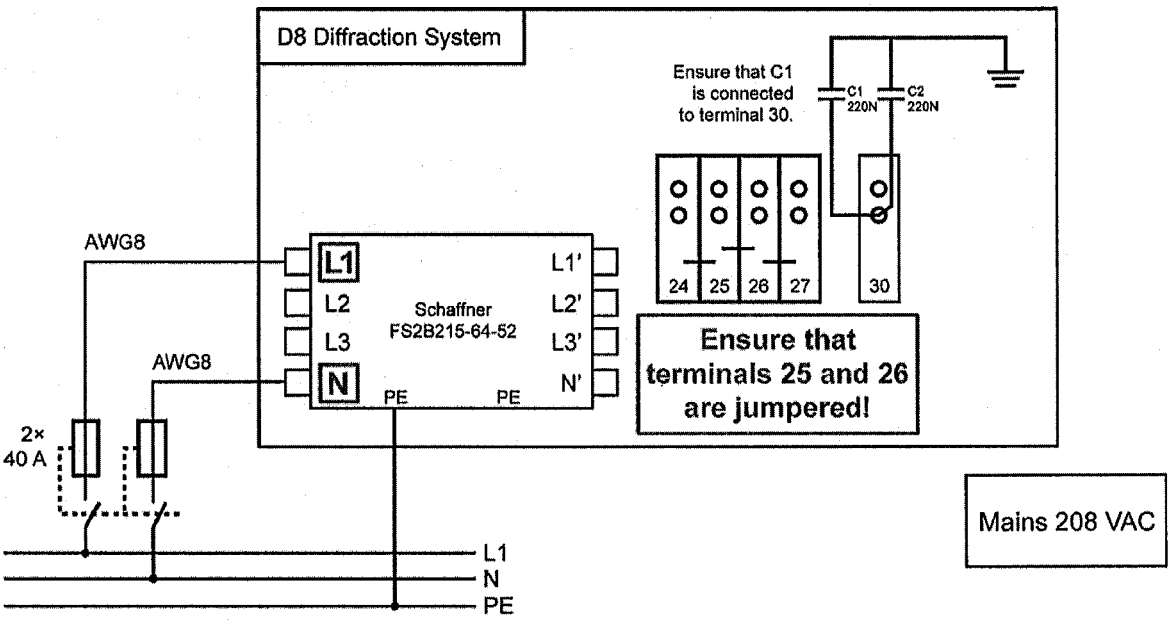


Figure 4. D8 DISCOVER electrical connections (schematic)



DANGER

If the mains power is incorrectly connected, damage to the instrument WILL occur!

Water Recirculators

The system is cooled by an external closed-circuit water recirculator.

NOTE: If you do not wish to install a Haskris closed-circuit water recirculator, contact Bruker AXS for more information.

CAUTION

Damage to system components due to improper cooling water is not covered by warranty.

During installation, the Bruker AXS Field Service Engineer will connect customer-supplied couplings and the two factory-supplied 10 m (32.5'), 12 mm (½") inside diameter hoses between the water supply and the return line to the instrument. The ends of the pipe require shutoff valves where they connect to the instrument. Install barbed fittings (supplied) to connect the hoses to the generator.

The maximum distance between the instrument and the external water recirculator is 15 m (48'). The maximum elevation difference is 6 m (20').

NOTE: The recirculator's water valve opens only when it needs cooling. This keeps water consumption to a minimum (particularly important for open cooling system arrangements).

NOTE: To protect the cooling equipment, ensure that the water is free of suspended matter. Also, ensure that water hardness does not exceed 300 mg/L CaO, while remaining at neutral pH (7).

R100C Water Recirculator

Table 7. R100C technical features

R100C Technical Features	
Unit dimensions	89.0 cm x 53.0 cm x 73.6 cm (35.0" x 21.0" x 29.0")
Unit weight	148 kg (325 lbs)
Cooling capacity when water source is 18° C (65° F)	3850 W (13125 btu/hr)
Water pump capacity	14.1 l/min (3.7 gal/min)
Water reservoir volume	23.0 l (6 gal)
Temperature stability	±1.1° C (2° F)
Refrigerant	R134a
Coolant required	Clean, potable, distilled water

Table 8. Condenser cooling water requirements

Condenser Cooling Water Requirements	
If water temperature is 18° C (65° F)...	...flow rate required is 3.8 l/min (1.0 gal/min)
If water temperature is 24° C (75° F)...	...flow rate required is 5.7 l/min (1.5 gal/min)
If water temperature is 29° C (85° F)...	...flow rate required is 11.8 l/min (3.1 gal/min)
Minimum required pressure differential from condenser water inlet to outlet	1.7 bar (25 psi)
Maximum required pressure differential from condenser water inlet to outlet	4.1 bar (60 psi)
Maximum condenser water inlet pressure	8.6 bar (125 psi)

Table 9. Location

Location	
Installation location	Must be installed in a clean, indoor environment. If possible, install the recirculator in a separate room to minimize noise and heat emission.
Accessibility	We recommend access to: ■ the TOP for routine maintenance, such as changing water in the reservoir; ■ the FRONT for visibility of controls and readouts; and ■ ONE SIDE for convenient servicing should a spare part be required.

Figure 5. Haskris model R100C technical specifications diagram

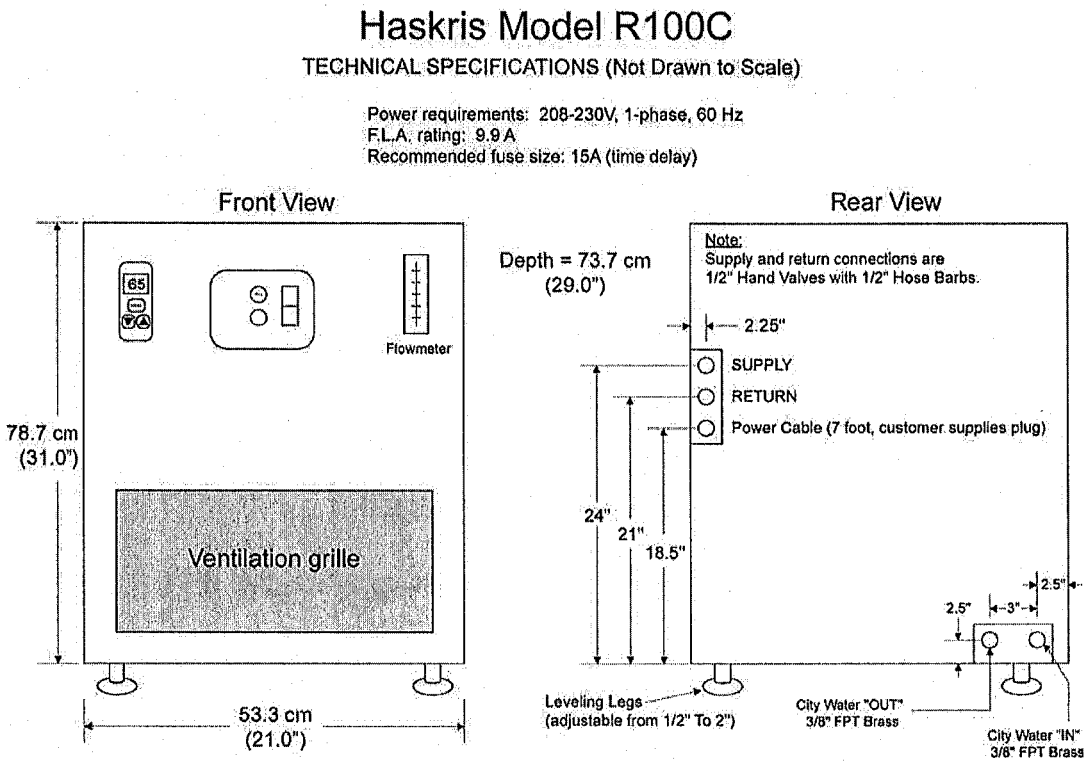
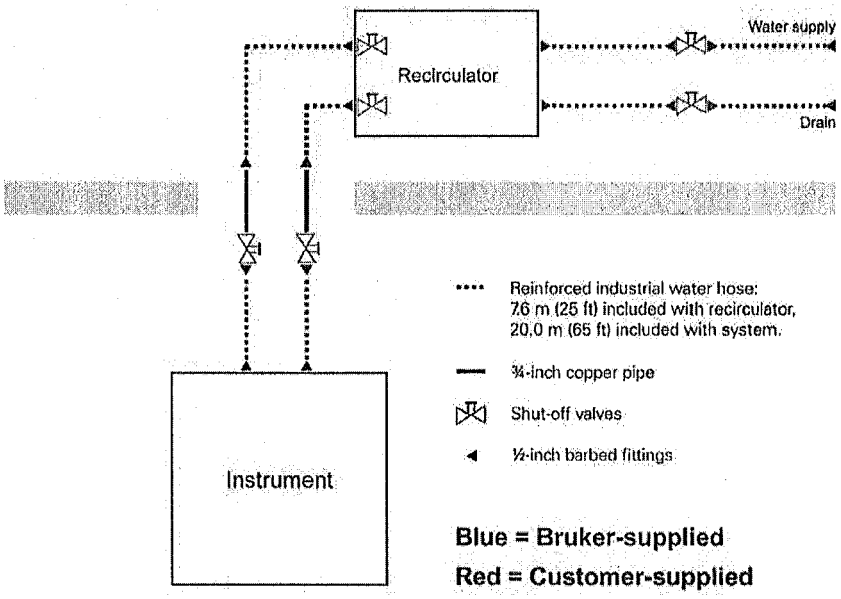


Figure 6. Haskris R100C connections diagram



Other Specifications

Helium or Nitrogen Supply (Optional)

- For equipment with a helium or nitrogen flush option (required for liquid or loose powder analysis), install a helium or nitrogen cylinder with a two-stage regulator as noted in Table 10.
- Secure the cylinder with a mounting support to avoid accidental tipping.

Table 10. Helium specifications

Gas	Cylinder/Regulator (not factory-supplied)
Helium or nitrogen	Compressed-gas cylinder with T-size cylinder filling pressure, 2900 psi (180 bar), with regulator such as AGA model SGVHPT270B-580 or equivalent.

Changing the System's Location

With each permanent location change, the following points must be considered:

- Before permanently changing the location of the system, please consult your local Bruker AXS Service Representative.
- All mechanical vibrations are to be avoided during system transport. Otherwise, sensitive physical components may be damaged.
- The mains connection at the new location must meet the requirements given in the system's Pre-installation Guide.
- At the new location, make sure that all local radiation protection regulations and operation permits are strictly observed.

Final Check

You, the customer, are responsible for meeting all applicable building and safety codes. Once the pre-installation utilities are connected, get certification (from an approved authority) that the installation meets all local building and safety codes.

When all pre-installation work is finished, contact the Bruker AXS Service Department by telephone to confirm that your site is ready for installation.

Tel: 1 (800) 234-XRAY [9729] or 1 (608) 276-3087

Upon receiving confirmation that your site is ready, Bruker AXS personnel will schedule the instrument installation.

When the System Arrives

- When the system arrives, check it for damage with the delivery driver. Contact the carrier's office and Bruker AXS immediately if you find any damage. Check the tip and shock indicators (if present).
- Compare the packing list (i.e., the number of boxes received) with your order invoice and contact Bruker AXS if you find any discrepancies.
- Move boxes or crates to the installation site (if possible) to facilitate timely installation. Wait until a Bruker AXS Field Service Engineer opens the boxes to check their contents against your invoice. Do not open or uncrate any boxes.
- If uncrating is required, call Bruker AXS for authorization at 1(800) 234-XRAY [9729]. If you are authorized to uncrate the shipment, save all packing material until the Bruker AXS Field Service Engineer completes the installation.
- Installation must be performed by a Bruker AXS Field Service Engineer.
- Save all packing materials for the system until the Bruker AXS Service Engineer has completed the installation.

North American Service Center Contact Information

Table 11. Bruker AXS North American Service Center contact information

Bruker AXS North American Service Center	
Address:	Bruker AXS Inc. Customer Support 5465 East Cheryl Parkway Madison, WI 53711-5373 USA
Toll-free telephone:	1 (800) 234-XRAY [9729]
Direct line:	1 (608) 276-3087
Fax:	1 (608) 276-3015
E-mail:	Customer.Service@bruker-axs.com
Web:	http://www.bruker-axs.com

D8 DISCOVER Pre-installation Checklist

Please complete the Checklist below and fax it to the Bruker AXS Service Department:

TO:

Bruker AXS Attn: Service Department, 1 (608) 276-9162 or 1 (608) 276-3015

FROM:

Contact Name

Company/Organization

Phone

Fax

Email

Component		YES/NO	Value/Remark	Initial/Date
Room Location	Floor load capacity exceeds 1100 kg/m^2 (225.3 lbs/ft^2)			
	Room height exceeds 204.0 cm (80.3")			
	Floor space for D8 DISCOVER free of equipment and clean			
	Doors and hallways from loading dock to location have adequate clearance for moving the D8 DISCOVER in its shipping crates; freight elevator available			
	Clearance on all sides of uncrated unit exceeds 70.0 cm (27.6")			
	Computer table within 4.0 m (13.0') of instrument			

Component		YES/NO	Value/Remark	Initial/Date
Environment	System is not exposed to direct sunlight			
	Temperature between 15.0° - 35.0° C (59.0° - 95.0° F)			
	Temperature gradient less than 1.0° C (1.8° F) per hour			
	Heat removal capacity exceeds 1.0 kW (3412 btu/hr)			
	Relative humidity between 20% - 80%, no condensation			
	Carpeted rooms: anti-static carpeting or mats installed			
Communications	Telephone line			
	Network connection			
Electrical Power	208-240 VAC, 50/60 Hz, 1-phase, (2) 40 A fuses/ breakers (D8 DISCOVER)			
	208-230 VAC, 60 Hz, 1-phase, 15 A fuse (Haskris R100C)			
	110-220 VAC, 50/60 Hz, 1-phase, 15 A fuse (Computer and peripherals)			
	All electrical power for the system must be isolated from circuits that have high starting currents (e.g., air conditioners, pumps, furnaces)			
	Electrical connection of instrument to mains power supply is provided with automatic circuit breakers for all phases			
	It is possible to disconnect the D8 DISCOVER completely from the mains power supply, using either a labeled switch or a circuit breaker located near the system			
	Power cable connected directly to switch box			
	Socket outlet according to DIN49462, VDE 0623, IEC 309-1 (Approved plug connector supplied by customer)			

Component		YES/NO	Value/Remark	Initial/Date
Cooling Requirements	Closed cooling system (Haskris R100C recommended)			
	Plumbing/piping complete (for Haskris R100C)			
	Customer-supplied cooling system (not recommended)			
The Haskris R100C water recirculator meets the cooling water requirements of the system. If you provide your own water supply, it must meet the following requirements:				
Customer–supplied cooling system (if used)	Flow rate greater than 3.6 L/min (1 gal/min). Recommended rate: 4.0 L/min (1.1 gal/min) or higher.			
	Pressure 4 - 7.5 bar (60 - 110 psi) and pressure-free drain			
	Temperature 15 - 20°C (59 - 68°F). Room temperature must be high enough to avoid condensation.			
Bruker AXS recommends the use of distilled or reverse osmosis (RO) water for cooling the X-ray tube and generator. Use of deionized water is NOT recommended. If building water is used, it must meet the following requirements:				
Building water (if used)	Hardness less than: 300 mg/L CaO, or 30° CaO (German scale), or 53.7° CaO (French scale), or 37.5° CaO (UK scale)			
	pH of 7.0 ± 1			
	Adequate filtering to remove suspended solids (~ 50 µm)			
Plumbing Requirements	Distance to water supply less than 15 m (48') if Haskris used			
	Shutoff valves installed on both lines (not required if discharging into drain)			
	Elevation difference between Haskris and instrument less than 6 m (20')			
	NW ½" hose barb fittings for supply and return of cooling water			

Component		YES/NO	Value/Remark	Initial/Date
Helium or nitrogen gas (if applicable)	Non-factory-supplied cylinder/regulator securely mounted to wall within 2 m (6') of the D8 DISCOVER			
	If mounted farther away than the supplied hose length, correct tubing/piping line installed			
Vacuum	Exhaust to outside (optional)			
Final Check	All local safety codes are met			
	Fax a copy of this form to: Bruker AXS, Attention: Service Department 1 (608) 276-9162			
	Call for installation: 1 (800) 234-XRAY [9729] extension 3087			
When system arrives: Check packing crates for shipping damage. If there is damage, contact your Carrier's Office and Bruker AXS. Compare the packing list (the number of boxes) with your invoice. If possible, move boxes (crates) to installation site or storage area. Do not open crates or boxes. If uncrating is required, call Bruker AXS for authorization at 1 (800) 234-XRAY [9729] extension 3087.If authorized to uncrate, save all packing material until the Bruker AXS Field Service Engineer completes installation.				

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