

Thermo Haake

Instruction Manual D1-L; D1-G; D1-GH

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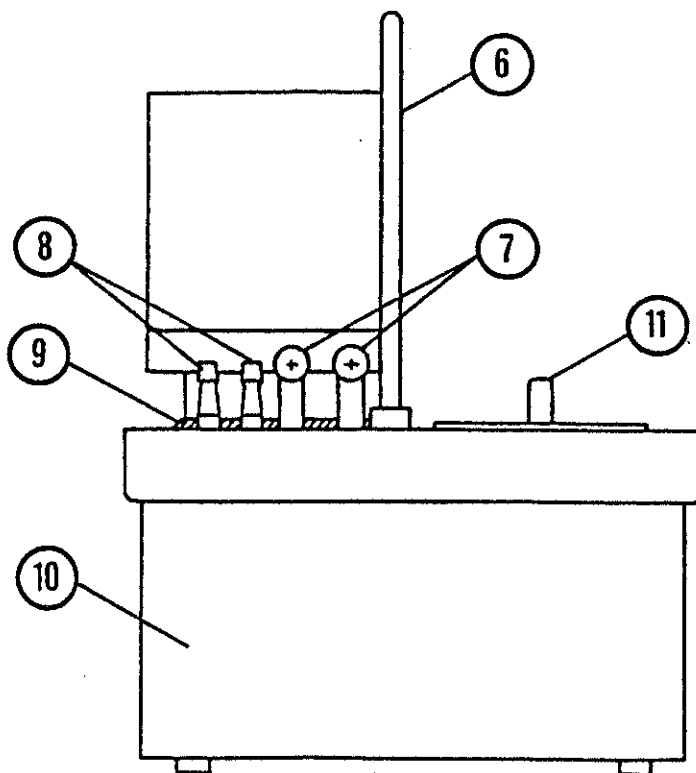
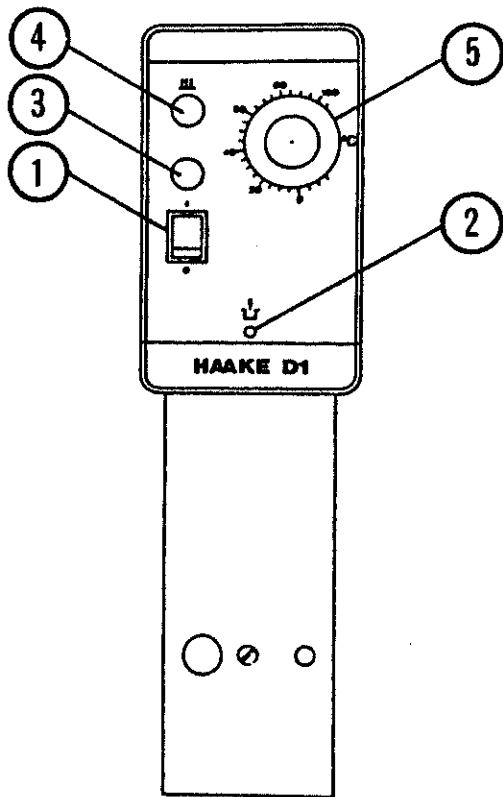
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Panel Controls and Indicators (1):

Temperature Control Unit D1

D1-L (Side View)

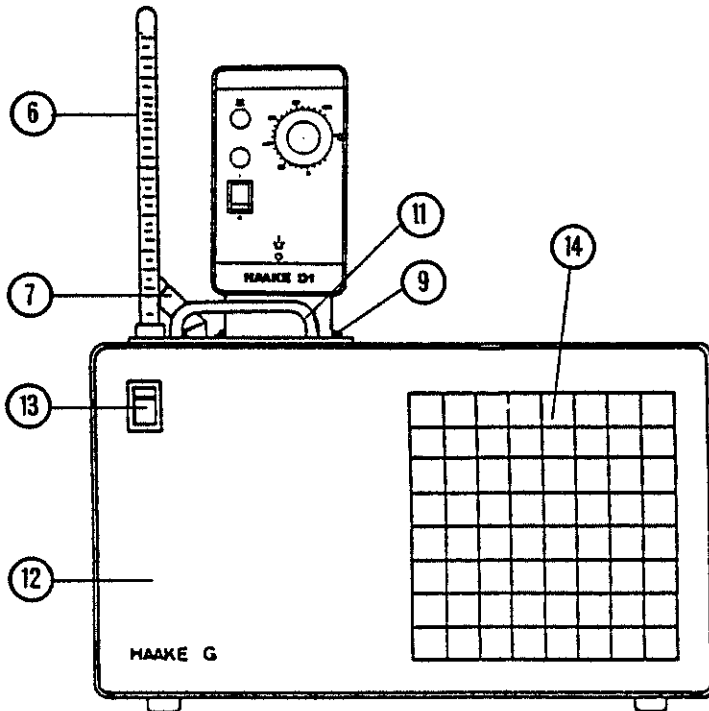


- (1) Main Power Switch D1
- (2) Reset Key
- (3) Power Indicator Light
- (4) Heater-On Indicator
- (5) Temperature Setting
- (6) Checking Thermometer
- (7) Tubing Connection (external liquid circuit)
- (8) Tubing Connection (cooling water circuit)
- (9) Gasket
- (10) Bath Vessel "L"
- (11) Lid

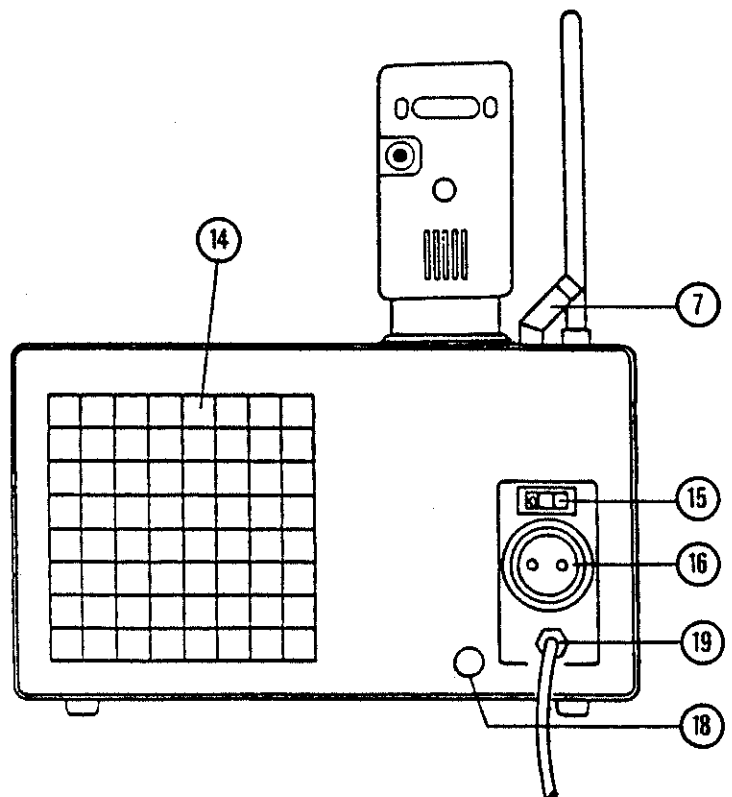
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Panel Controls and Indicators (2)

D1-G - Front Side



D1-G - Rear Side

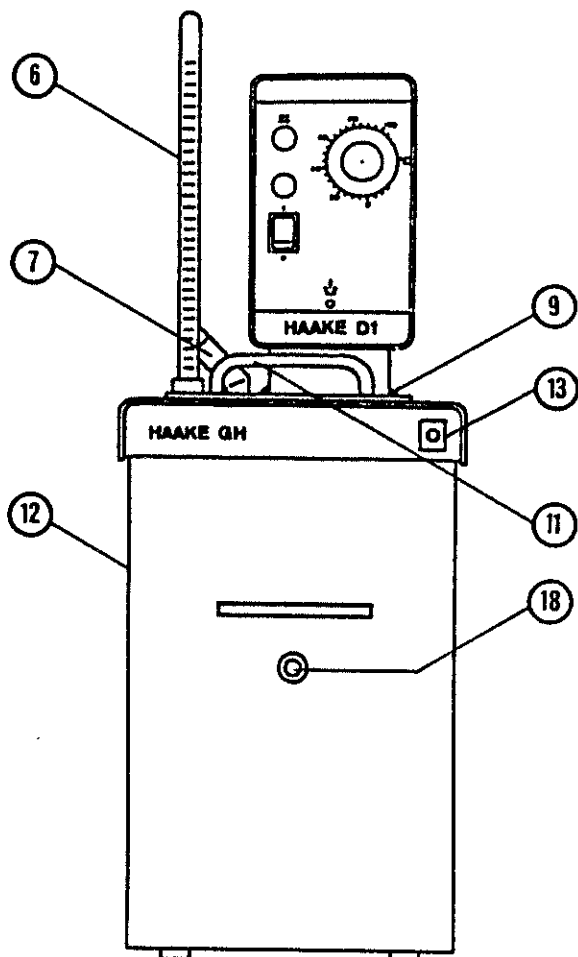


- (6) Checking Thermometer
- (7) Tubing Connection (external liquid circuit)
- (9) Gasket
- (11) Lid
- (12) Refrigerated Bath "G"
- (13) Main Power Switch (Refrigerated Bath)
- (14) Cooling Grid
- (15) Power Switch for Cooling Compressor
- (16) Socket for D1 Line Cord
- (18) Drain Screw
- (19) Line Cord - Refrigerated Bath "G"

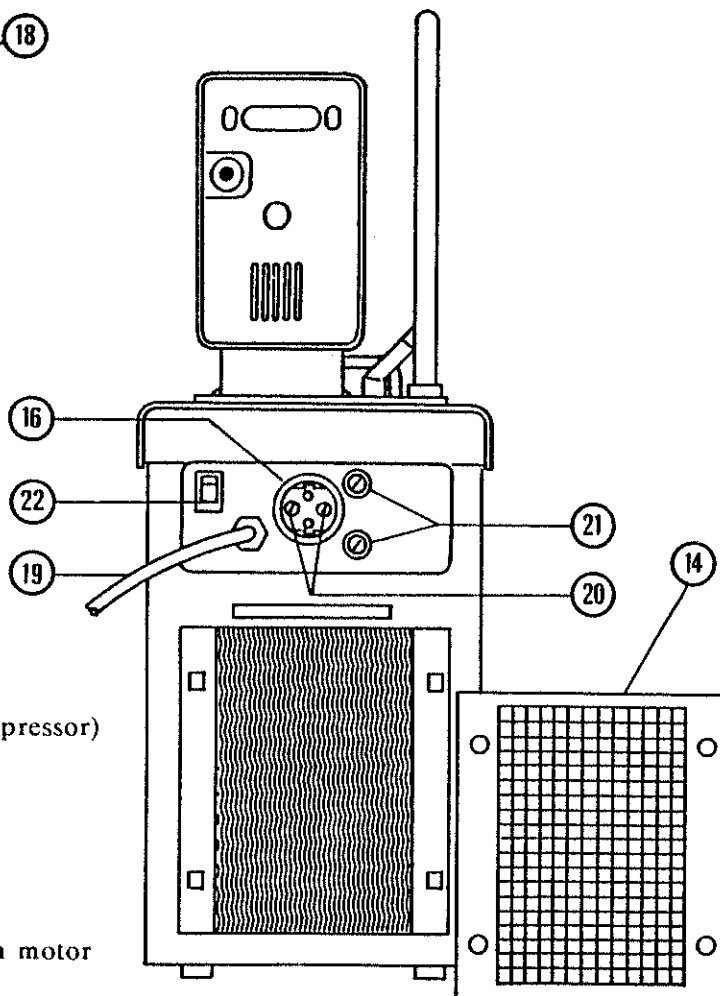
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Panel Controls and Indicators (3)

D1-GH - Front Side



D1-GH - Rear Side



- (6) Checking Thermometer
- (7) Tubing Connection
(external liquid circuit)
- (9) Gasket
- (11) Lid
- (12) Refrigerated Bath "GH"
- (13) Main Power Switch
(Refrigerated Bath and Cooling Compressor)
- (14) Cooling Grid, removable
- (16) Socket for D1 Line Cord
- (18) Drain Screw
- (19) Line Cord - Refrigerated Bath "GH"
- (20) Fuses
- (21) Fuses
- (22) Switch for speed changing of the fan motor

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Description:

The Heating Bath and Circulator D1-L and the Refrigerated Baths and Circulators D1-G and D1-GH are suitable to maintain constant temperatures of thermal liquids:

The main application is the temperature control of instruments and apparatus which can be connected to an external closed liquid circuit e.g. if they are provided with a temperature control jacket.

Additionally beakers/tubes etc. can be temperature-controlled directly in the vessel.

The unit may only be used for unsupervised operation if water or water with some antifreeze are used as bath liquid. Neither the safe operation of the unit nor the temperature range listed can be warranted if bath liquids other than water are used.

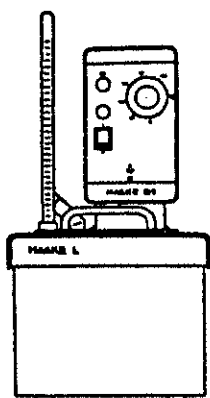
Both, the D1-G and the D1-GH contain an integrated cooling compressor enabling it to reach and maintain temperatures down to -10°C .

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Inventory Checklist:

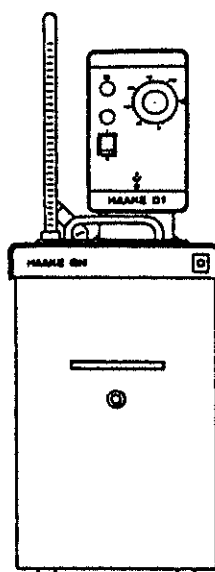
- a) **D1-L** - This Heating Bath/Circulator comprises:

Temperature Control Unit D1
Checking Thermometer
Bath Vessel "L"
Tubing
Tube Couplings
Tube Clips



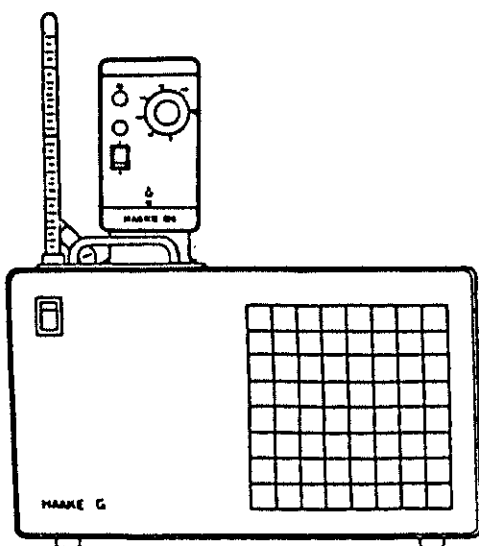
- b) **D1-GH** - This Refrigerated Bath /Circulator comprises:

Temperatur Control Unit D1
Checking Thermometer
Refrigerated Bath "GH"
Tubing
Tube Coupling
Tube Clips



- c) **D1-G** - This Refrigerated Bath/Circulator comprises:

Temperature Control Unit D1
Checking Thermometer
Refrigerated Bath "G"
Tubing
Tube Couplings
Tube Clips



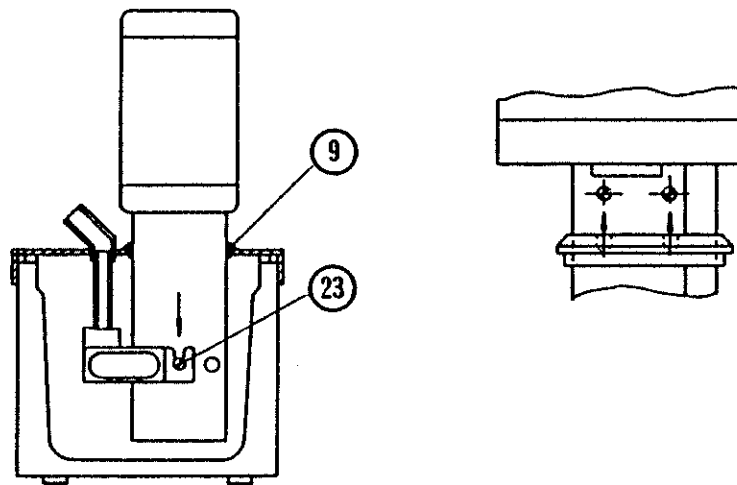
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OPERATING INSTRUCTIONS

Unpacking:

The packing is designed to reduce the danger of damage in transit. Should there be any damage to the circulator or other parts, please inform the delivery agency to facilitate any damage claim. Please contact the dealer from whom you bought the unit prior to returning it. Minor problems can often be cleared and corrected on site.

Assembly:



1. Slide the gasket (9) over the rectangular protective shield of the temperature control unit so that the screw heads on the side of this protective shield become hidden in the notches provided in the gasket.

NOTE: The notches in the gasket as well as the screws are not positioned symmetrically to the center line of the protective shield.

2. Temperature control unit D1 is pushed vertically into the bath vessel until the screw stop is seated in the notch (23) of the elbow connector to the tube fitting. The screw heads at the side of the rectangular shield are then covered by the gasket (9).
3. The screw (23) is tightened with a screw driver in order to prevent a leakage between the protective shield and the baffle plate.

D1-G and D1-GH only:

The mains cable of the D1 is plugged into socket (16). The mains cable (19) of the refrigerated bath is plugged into a suitable power outlet.

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Filling:

The immersion depth of the D1 is between 85 and 140 mm as marked on the rectangular shield of the D1 temperature control unit. The filling level should neither be below 85 mm nor should it exceed the high mark of 140 mm. All filling heights between 85 and 140 mm are allowed. Distilled water – if necessary with a small amount of antifreeze for the D1-G and D1-GH – is required as bath liquid.

Recommended Tubing:

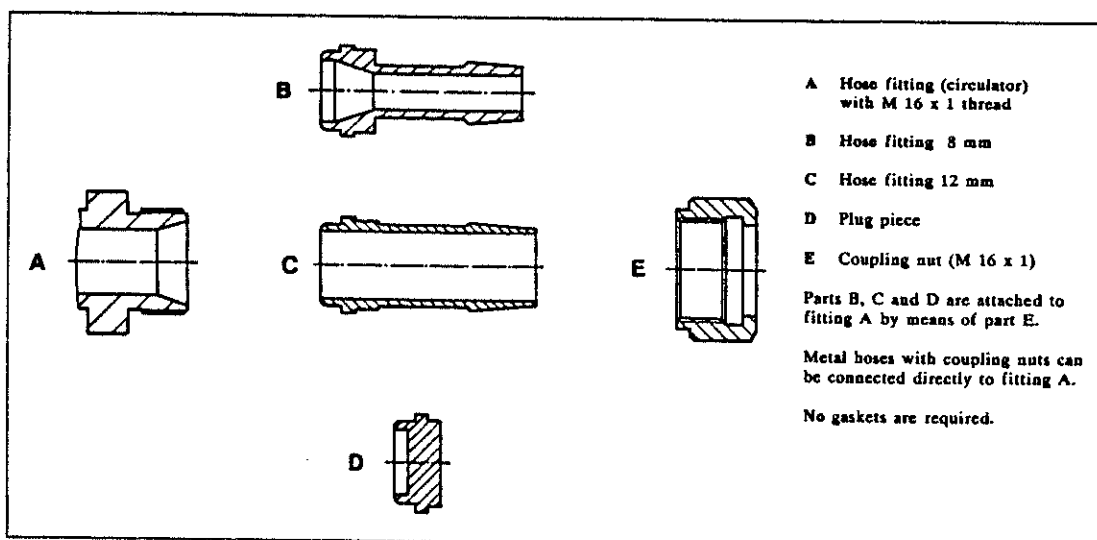
PVC tubing for temperatures of +10 to +60°C

Perbunan tubing for temperatures of -10 to 100°C

Connection of Tubing:

- Temperature control directly in the bath vessel: Close pressure and suction nozzle with the plug piece D and the coupling nut.
- Connect to external closed loop systems e.g. instruments with a closed temperature control jacket or a heat exchanger coil: Attach the required hose fittings to the nozzles (7) according to the description below. Lead a tube from the rear nozzle (7) to the external instrument and a second hose (back flow) to the front nozzle (7).

All tubing connections should be safeguarded with clips.



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Main Power Connection:

For safety reasons, connect the unit to a grounded mains outlet only. Compare the local voltage conditions with the specifications of the name plate prior to the actual connection. Deviation of $\pm 10\%$ are allowed.

Starting:

- a) **D1-L** – Start the unit by pressing the main power switch (1). The main power control light (3) will now be on, the pump motor runs, bath liquid is circulating and with the preset temperature higher than the actual temperature of the bath liquid, the heating control light (4) will indicate that the heater is on. During the heating up phase the heating control light is constantly on and it will flash during the controlling phase.
- b) **D1-G, D1-GH**
 - 1. Start the unit by actuating the main power switch (13). The main power control light will be on, the cooling fan for the refrigerated bath is operating and socket (16) delivers power.
 - 2. Start the temperature control unit D1 by pressing the main power switch (1). The main power control light (3) will now be on, the pump motor runs, bath liquid is circulating and with the preset temperature higher than the actual temperature of the bath liquid, the heater control light indicates that the heater is on. During the heating up phase the heating control light is constantly on and it will flash during the controlling phase.
 - 3. If cooling action is not required, the cooling compressor of the D1-G should be switched off separately with switch (15). The cooling fan for the compressor must run as otherwise there would be a build-up of undue high pressure in the cooling circuit.
 - 4. For standard applications, first the automatic speed control of the fan motor is switched on (switch 22). The speed of the fan is adjusted automatically according to the requirements of heat removal capacity or ambient temperature.

Temperature Presetting:

The temperature can be roughly set with the setting button (5).

The temperature in the bath is monitored with a checking thermometer supplied as standard accessory. Checking thermometers for precise measurements are also available. The temperature range is either 50°C or 100°C with a division of 0.1°C. (Refer to page 13, "Special Accessories"). Having the precise temperature indicated by a suitable thermometer, the temperature setting button (5) can now be used for compensating deviations.

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Cooling:

a) D1-L

Connection to tap water cooling:

Connect tube fittings of cooling coil (8). The flow rate direction is equal.

A minimum of 2°C to 3° above the cooling water temperature can be achieved by tap water cooling.

Connection to flow-through coolers:

Temperatures down to below 0°C may be achieved and controlled with the D1-L if a flow-through is integrated into the external liquid circuit of this unit.

It is recommended to use a HAAKE flow-through cooler DK12 which is connected to the return flow line of the external temperature control circuit.

b) D1-G, D1-GH

Both, the D1-G and the D1-GH are provided with a built-in compressor cooling compressor. The cooling coil is arranged on the outside of the integral bath. This design frees the bath from the cooling coil which in other refrigerated bath circulators is normally arranged inside the bath which reduces the available volume and tends to be quickly covered with dirt or other layers thus hampering the cooling capacity.

Bath temperatures between -10°C and approx. 30°C can only be achieved by constant cooling action against short heating pulses.

The cooling unit can also be used for pulling the bath liquid quickly down from high to low temperatures.

Unnecessary and permanent cooling against heating at high bath temperatures should be avoided: The pressure within the coolant circuit would increase unduly which in turn would mean a strain for the compressor. The cooling compressor is protected against excess heat and excess current by a KLIXON which in case of a fault or overload switches the unit off until the heat and the current have dropped below specified limits. Cooling will then start again automatically. If the fault as outlined above not be found and eliminated, the cooling system will run in an ON/OFF cycle with a frequency of 5 to 10 minutes, this will lead to great fluctuation of the bath temperature and eventually to a total breakdown of the cooling compressor.

At ambient temperatures of above 30°C or during high thermal loads, the cooling fan of the refrigerated bath "GH" will run faster for a short period of time which will be noticed as a higher operating noise. This design feature is to prevent excess pressures in the cooling circuit of the unit. If the fan motor is running in the low speed mode, the bath's outer surface temperature could increase. Especially during operation at a bath temperature of approx. 20°C, the speed is changed automatically from low to high. This results in temperature peaks in the bath liquid. In this case the speed controller should be switched off (switch 22).

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Overtemperature Protection:

The units are corresponding to the safety class 1 W in accordance with DIN 12 879. They may, therefore, be used without supervision under the condition that distilled water or water with some antifreeze is used as bath liquid.

The built-in safety element prevents uncontrolled heating of the bath liquid beyond 100°. Secondly it protects the circulator if the liquid level drops due to excessive evaporation. When the upper edge of the heater element reaches a temperature of 130°C, the pump and the heater are cut off and the reset key (2) will have to be activated for restarting the unit. However, this can only be done after the cause for the malfunction has been found and corrected.

Special Instructions for the Operation of the D1-G and D1-GH

For continuous, long-term operation of the cooling system it is essential that air passes unobstructed through the front and rear ventilation grids, i.e. the units must not be placed too near to a wall nor should objects be allowed to cover these grids.

Once the cooling compressor has been switched off, it cannot be restarted immediately (automatic overload protection) because the compressor would then have to start up against high internal pressure. After about 5 to 10 minutes, when the pressure in the cooling gas circuit has levelled off, the compressor can be restarted.

The heat exchanger (liquefier) which is part of the cooling system must be kept clean. Its fins have to be cleaned regularly. A heat exchanger badly covered with a thick layer of dust and lint will cause an increase of the internal cooling gas pressure. This in turn, hampers the cooling capacity. In extreme cases, this can lead to irregular ON/OFF cycles due to the activated KLIXON.

For the D1-G it is sufficient to use an air-gun. The D1-GH offers the possibility to remove the rear panel very quickly. Thus, the liquefier can also be cleaned with a stiff bristled brush.

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Technical Specifications (in accordance with DIN 58 966)

		D1-L	D1-G	D1-GH
Operating Temperature Range	°C	30 to 100	-10 to 100	-10 to 100
Extended Temperature Range *)	°C	-10 to 100	--	--
Temperature Setting Mode		analog		
Temperature Control Accuracy	°C	± 0.2		
Temperature Control Mode		ON/OFF		
Control Sensor		Hydraulic Thermoregulator		
Heater Capacity	W	1000		
Cooling Coil		Standard	--	--
Cooling Capacity at 20°C	W	--	200	340
Pressure Pump: max. pressure	mbar	120		
max. flow rate	l/min.	12		
Safety Element		Hydraulic Thermoregulator		
Safety Class		1 W		
Bath Depth	mm	150		
Bath Opening	mm	125 x 100	125 x 100	170 x 150
Filling Volume	l	3	3	4.5
Overall Dimensions: WxLxH	mm	190x285x380	375x360x390	220x405x430
Weight	kg	7	22	25
Submerged parts:		Stainless Steel 18/8 / Plastic		
Total Wattage	W	1050	1210	1310
Power Requirements:	W	220 V ± 10% /50-60	220 V ± 10% /50	220 V ± 10% /50-60
RFI Suppression (VDE 0875)		N		
Allowable ambient temperature	°C	10 - 40		
*) with additional cooling (Optional)				

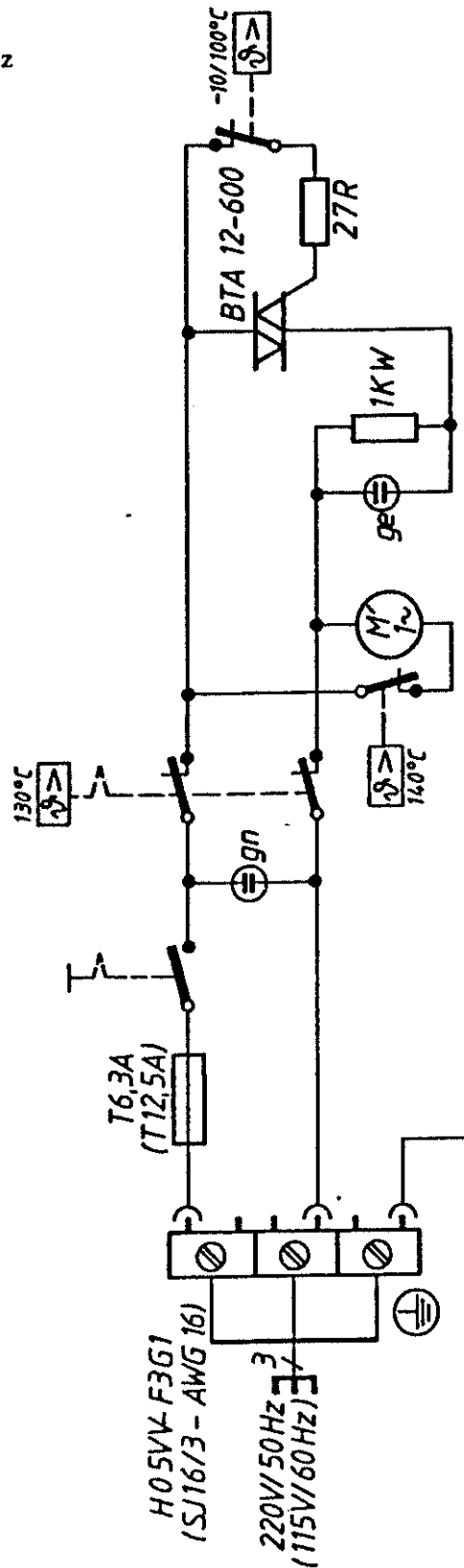
Special Accessories:

Order No.:	Description:
806-1152	Checking thermometer, division 0.1°, -1 to +51°C
806-1153	Checking thermometer, division 0.1°C, +49 to 101°C
082-0173	Tubing, Perbunan, 12 mm Ø I.D. (by the meter)
082-0172	Tubing, Perbunan, 8 mm Ø I.D. (by the meter)
333-0147	Spiral Spring (kink protection for 12 mm Ø hoses)
333-0133	Test Tube Rack for 18 tubes 16 mm Ø

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Circuit Diagram

D1 - 220V/50 Hz, 115V/60 Hz

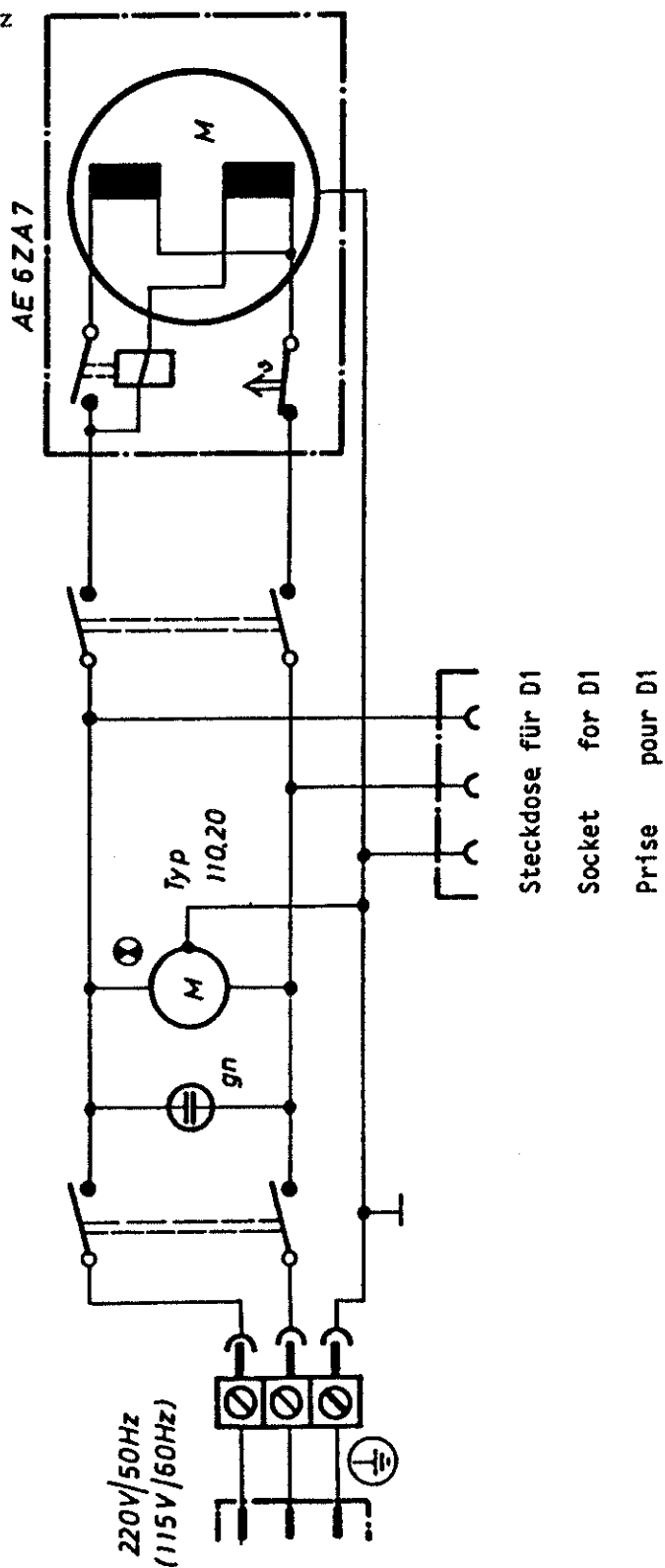


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Circuit Diagram

Refrigerating Bath 'G'

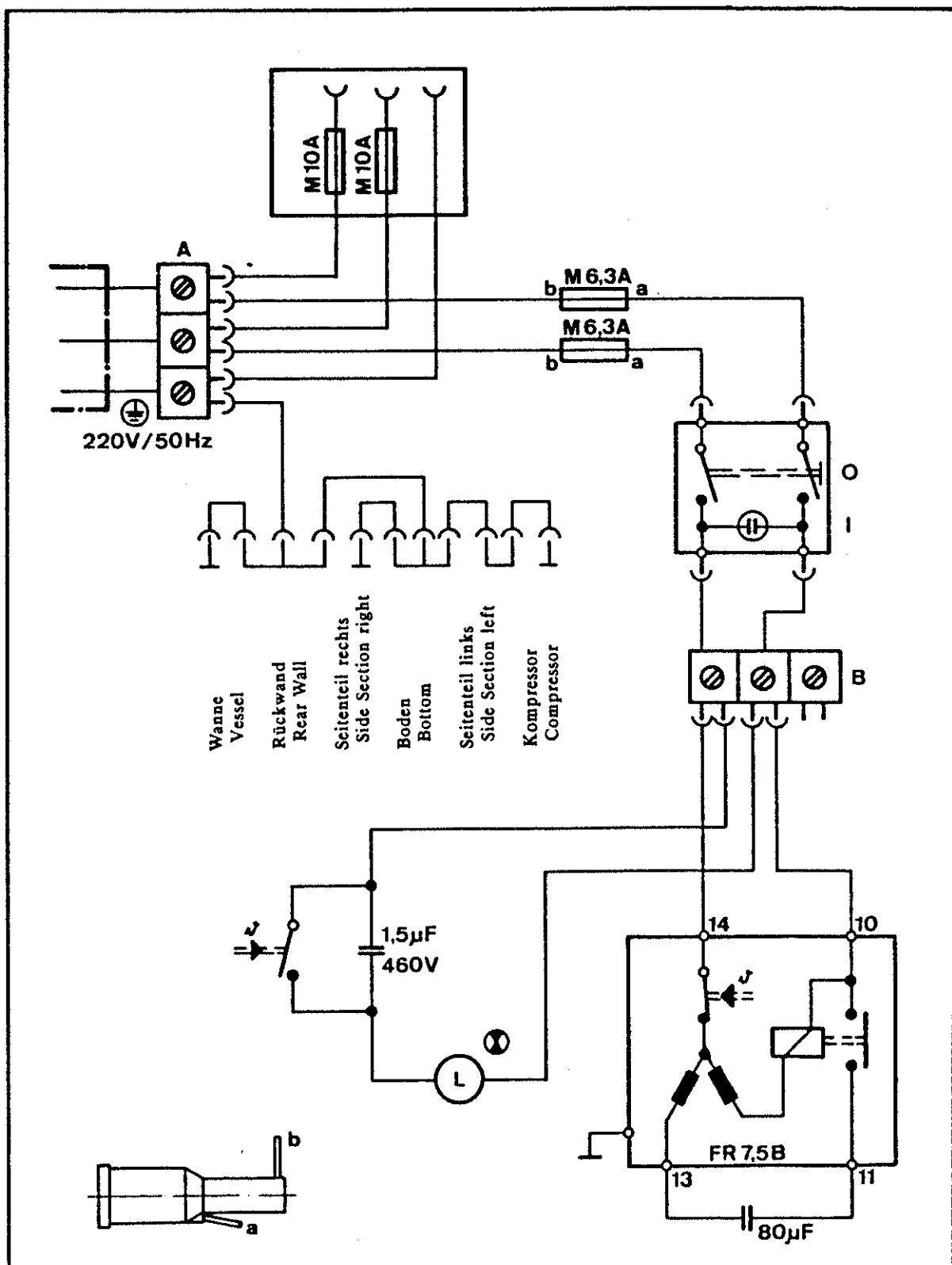
220V/50 Hz, 115V/60 Hz



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Circuit Diagram

Refrigerating Bath 'GH', 220V/50 Hz



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Circuit Diagram

Refrigerating Bath 'GH', 115V/60 Hz

