datacolor

Operation Manual

Datacolor CONDITIONER™

Sample conditioning cabinet
with RP1 controller
with and without lighting option

Rev 3.0
7th August 2007
DCCOPMN_RP1_03

CONTENTS

Dear Customer,

For correct and safe operation of the Datacolor CONDITIONER™ sample conditioning cabinet, it is necessary to read this operation manual completely and carefully, and observe all given instructions.

1. Safety

This operation manual is part of the scope of delivery. Always keep it at hand.

To avoid injuries and damage observe the safety instructions of the operation manual.

WARNING

Failure to observe the safety instructions may lead to serious injuries and unit damage.

- Observe the safety instructions in this operation manual.
- Carefully read the complete operating instructions of the Datacolor CONDITIONER™ sample conditioning cabinet.

1.1 Legal considerations

This operation manual contains information necessary for the intended use, correct installation, start-up and operation, and for the maintenance of the unit.

Understanding and observing the instructions in this operation manual are prerequisites for hazard-free use and safety during operation and maintenance.

This operation manual cannot cover all conceivable applications. If you would like additional information, or if special problems arise that you feel are not sufficiently addressed in this manual, please ask your Datacolor representative.

1.2 Structure of the safety instructions

In this operation manual, the following harmonized denominations and symbols indicate dangerous situations, following the harmonization of ISO 3864-2 and ANSI Z535.4.

1.2.1 Signal word panel

Depending on seriousness and probability of the consequences, dangers are identified with a signal word, the corresponding safety color, and if appropriate, the safety alert symbol.

DANGER

Indicates an imminently hazardous situation that, if not avoided, will result in death or serious (irreversible) injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious (irreversible) injury

⚠ CAUTION
Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor (reversible) injury

CAUTION
Indicates a potentially hazardous situation which, if not avoided, may result in damage of the product and/or its functions or of a property in its ambiance.

1.2.2 Safety alert symbol

Use of the safety alert symbol indicates **risk of injury**.

Observe all measures that are marked with the safety alert symbol in order to avoid death or injury.

1.2.3 Pictograms

Warning signs			
 Electrical hazard	 Hot surface	 Explosive substances	 Tip over hazard
 High humidity	 Pollution Hazard	 Harmful substances	 Biohazard
Mandatory action signs			
 Mandatory regulation	 Read operating instructions	 Pull the power plug	 Lift with several persons
 Environment protection			
Prohibition signs			
 Do NOT touch	 Do NOT spray with water	 Do NOT climb	 Do not connect to pressurized main water.

Information to be observed in order to ensure optimum function of the product.

1.2.4 Word message panel structure

Type / cause of hazard. **Possible consequences.** ∅ Instruction how to avoid the hazard: prohibition ➢ Instruction how to avoid the hazard: mandatory action

Observe the other notes and information not specially emphasized in the same way, in order to avoid disturbances which could result in direct or indirect injuries or property damage.

1.3 General safety instructions on installing and operating

With regard to operating the Datacolor CONDITIONER™ sample conditioning cabinet and to the installation location, please observe the local national safety regulations that apply for laboratories or in a room similar to a laboratory.

When the CONDITIONER™ is installed, operated, cleaned, decontaminated, adjusted or set up incorrectly, there is a risk of malfunction which could cause harm to human beings and material damage to the equipment and samples.

Therefore the CONDITIONER™ should only be installed, operated, cleaned, decontaminated, adjusted and set up by suitably qualified persons.

- Persons qualified to install, operate, clean, and decontaminate the CONDITIONER™ include everyone who has carefully read the user manual.
- Persons qualified to repair and adjust the CONDITIONER™ only include electricians and service engineers authorized by the Datacolor, who have undergone appropriate electrical training and who have carefully read the CONDITIONER™ service and user manual.

To operate the unit, use only original Datacolor accessories, or accessories of third-party suppliers authorized by Datacolor

	**CAUTION** **Danger of overheating.** **Damage of the unit.** ∅ Do NOT install the unit in unventilated recesses. ➢ Ensure sufficient ventilation for carrying-off the heat.

	**DANGER** **Explosion hazard.** **Danger of life.** ∅ Do NOT operate the unit in potentially explosive areas. ∅ NO explosive dust or air-solvent mixture in the ambiance.

The Datacolor CONDITIONER™ provides no protection against explosions. Never install or operate the Datacolor CONDITIONER™ in a location where explosive gases, powder or solvent-air mixtures could penetrate.

DANGER

Explosion hazard.

Danger of life.

∅ Do NOT introduce any substance combustible or explosive at working temperature into the sample conditioning cabinet.

∅ NO explosive dust or air-solvent mixture in the inner chamber.

Any solvent contained in the charging material must not be explosive or inflammable. I.e., irrespective of the solvent concentration in the steam room, NO explosive mixture with air will form. The temperature inside the chamber must lie below the flash point or below the sublimation point of the charging material. Keep informed about the physical and chemical properties of the charging material, as well as the contained moisture constituent and its behaviour under addition of heat energy and humidity.

Keep informed about any potential health risks caused by the charging material, the contained moisture constituent or by reaction products that may arise during the temperature process. Take adequate measures to exclude such risks prior to putting the sample conditioning cabinet into operation.

DANGER

Electrical hazard.

Danger of life.

∅ The unit must NOT become wet during operation or maintenance.

The sample conditioning cabinets have been produced in accordance to the VDE regulations and were routinely tested in accordance to VDE 0411.

CAUTION

The glass doors and the inner chamber will heat up to 50°C during operation.

∅ Do NOT touch the glass doors, the inner surfaces and the charging material during operation.

WARNING

Tip over hazard.

Danger of injury.

Damage of the unit and the charging material.

Housing cover breakaway.

∅ Do NOT climb the lower housing cover.

∅ Do NOT charge the lower housing cover with heavy objects while the unit door is open.

1.4 Intended use

Datacolor CONDITIONER™ sample conditioning cabinets are designed for exact conditioning of harmless materials. A mixture of any component of the charging material mixed with air must NOT be explosive. The operating temperature must lie below the flash point or below the sublimation point of the charging material.

	Respecting the instructions in this operation manual and conducting regular maintenance work (chap. 11) is part of the intended use.

2. Unit description

Datacolor CONDITIONER™ sample conditioning cabinet with controller RP1 is available in two different types:

- with lighting unit
- without lighting unit

Datacolor CONDITIONER™ is designed for exact conditioning of harmless materials such as paper, textiles, plastics, building materials, to condition the samples at fixed temperature and humidity, so as ensure no change in color of the samples occurs due to varying temperature and humidity

The inner chamber, the pre-heating chamber and the inside of the doors are all made of stainless steel (material no. 1.4301 in Germany). The housing is RAL 7035 powder-coated. All corners and edges are completely coated.

The inner chamber is closed by a glass door that enables the samples to be viewed for a short time without disturbing the climate in the inner chamber.

Datacolor CONDITIONER™ is equipped with a microprocessor controller with 2-channel technology for temperature and humidity and a digital display accurate to one-tenth of a degree resp. 0.1 % RH

With its microprocessor controlled humidifying and dehumidifying system the Datacolor CONDITIONER™ is a high-precision sample conditioning cabinet. An electrode steam humidifying system humidifies the air. There are no special demands on water quality; only the conductivity of the water is significant (chapter 4.1).

2.1 Datacolor CONDITIONER™ with lighting unit

The Datacolor CONDITIONER™ system with lighting unit is equipped with 2 illumination cassettes, each with 2 illumination tubes. The tubes, with UVA portion, present a spectrum close to the spectrum of artificial sunlight D65 ISO 10977.

The unit can be operated in a temperature range from 10 °C up to 50 °C and a humidity range of 10 % RH to 70 % RH.

Standard temperature and humidity settings for sample conditioning are typically 21 °C and 65 % RH.

Datacolor CONDITIONER™ is equipped with two safety devices to protect the unit, its environment and the samples inside from forbidden temperature excesses:

- Electric safety controller

  The sample conditioning cabinet is equipped with an electric over temperature safety device class 3.1 acc. to DIN 12880. It is called “safety controller”. It serves to protect the material being tested against extensive high temperatures. The safety controller is electrically independent from the main temperature controller and takes over control when a selectable set point is reached.

- Temperature limiter

  The sample conditioning cabinet is equipped with a temperature limiter, class 1 acc. to DIN 12880. It serves to protect the unit and prevents danger caused by considerable defects. If a temperature of about 66°C is reached, the temperature limiter switches off the unit permanently.

2.2 Datacolor CONDITIONER™ without lighting unit

The Datacolor CONDITIONER™ system without lighting unit can be operated in a temperature range from +10 °C up to 90 °C and a humidity range of 0 % RH to 90 % RH if the humidity control is switched on. For possible combinations of temperature and humidity values without condensation see operating range, chap. 9.2

Standard temperature and humidity settings for sample conditioning are typically 21 °C and 65 % RH.

The Datacolor CONDITIONER™ is equipped with two safety devices to protect the unit, its environment and the samples inside from forbidden temperature excesses:

- Electric safety controller

  The sample conditioning cabinet is equipped with an electric over temperature safety device class 3.1 acc. to DIN 12880. It is called “safety controller”. It serves to protect the material being tested against extensive high temperatures. The safety controller is electrically independent from the main temperature controller and takes over control when a selectable set point is reached.

- Temperature fuse

  The sample conditioning cabinet is equipped with a temperature fuse, class 1 acc. to DIN 12880. It serves to protect the unit and prevents danger caused by considerable defects. If a temperature of about 110 °C in the inner chamber is reached, the temperature fuse switches off the unit permanently.

2.3 Unit overview

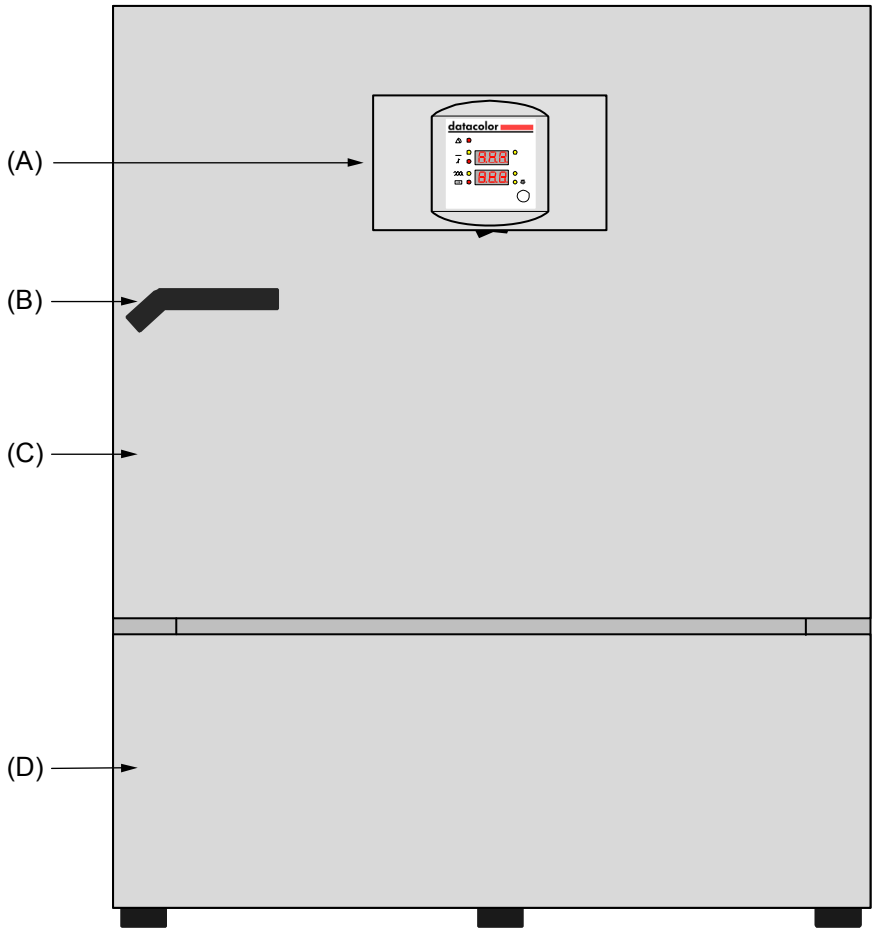


Figure 1: Front view

(A) Instrument box
(B) Door handle
(C) Outer housing door
(D) Lower front cover

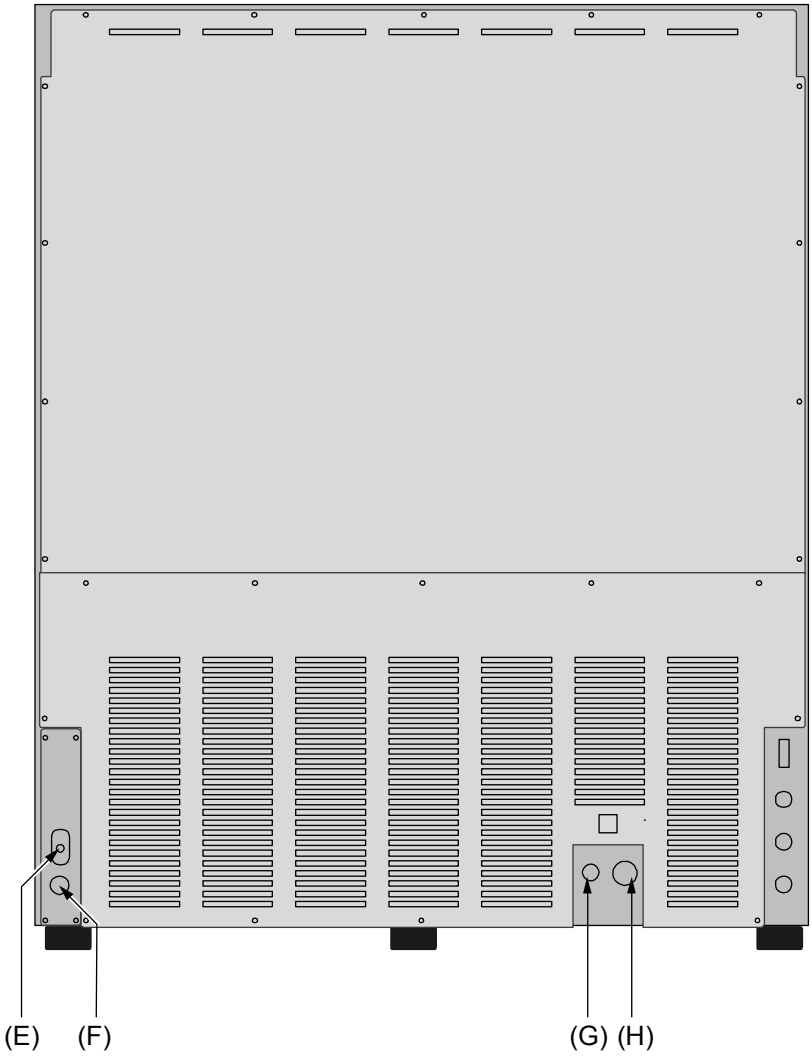


Figure 2: Rear view

(E) Mains cable

(F) Miniature fuse

(G) Waste water connection

(H) Mains water supply connection

2.4 Instrument box

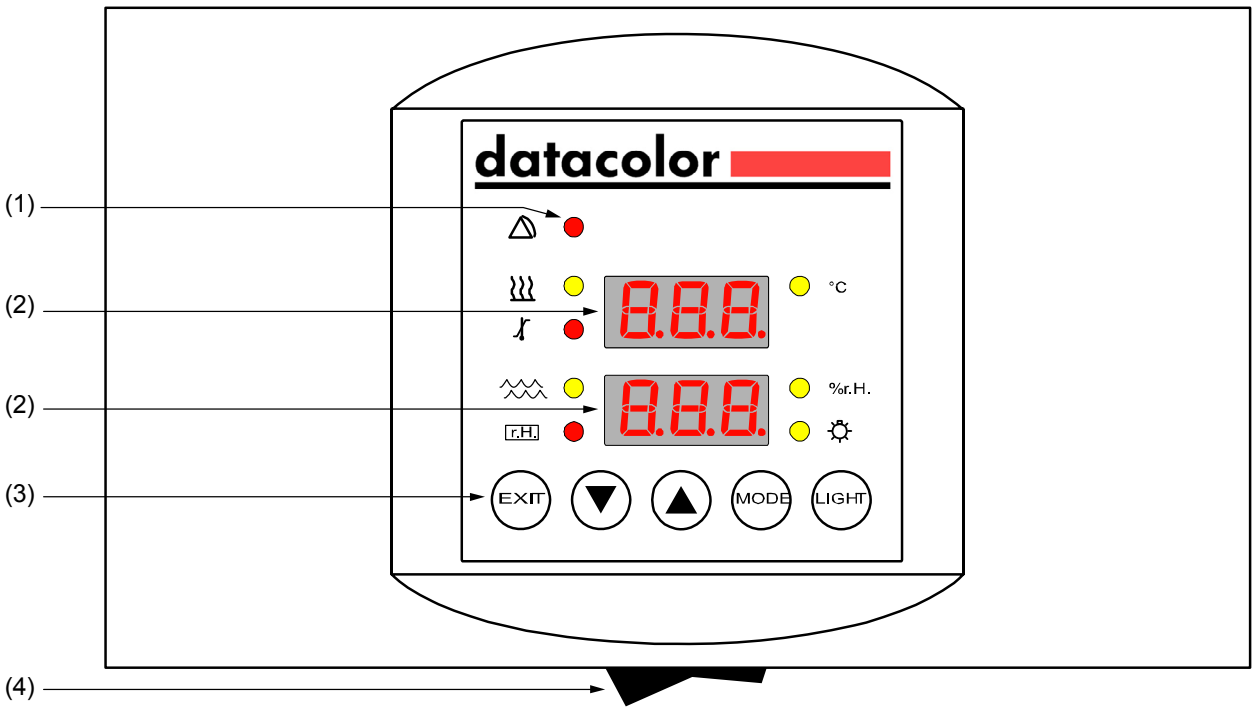


Figure 3: Instrument box

(1) Alarm and status LED (see Table 1)

(2) LED display

(3) Buttons (see Table 2)

(4) Main switch

Table 1: Alarm and status LEDs of controller user interface

Symbol	LED	Meaning
	red	General alarm
	yellow	Heating is active
	red	Temperature alarm
	yellow	Humidity system is active
	red	Humidity alarm
°C	yellow	• Basic display: in the upper display a temperature is displayed in °C (chap. 5, page 28) • Setup mode: in the upper display a temperature is displayed in °C (chap. 6, page 29)
%RH	yellow	• Basic display: in the lower display a humidity is displayed in % RH (chap. 5, page 28) • Setup mode: in the upper display a humidity is displayed in % RH (chap. 6, page 29)
	yellow	Light is active (*only CONDITIONER™ with lighting unit*)

Table 2: Buttons of controller user interface

Taster	Function
	Switch off the alarm sound
	Reduce the parameter value
	Increase the parameter value
	Confirm input and page forwards through the controller's parameter list
	Switch on/off the illumination (*only CONDITIONER™ with lighting unit*)

2.5 Lateral control panel

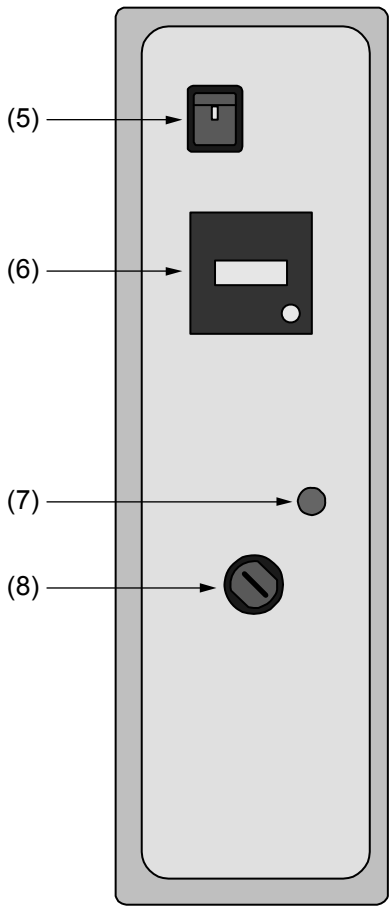


Figure 4: Lateral control panel Datacolor CONDITIONER™ at the left side of the lower front cover

(5) Humidity switch for switching on/off humidifying and dehumidifying system

(6) Counter of operating hours for operation of illumination tubes
(*only CONDITIONER™ with lighting unit*)

(7) Alarm pilot lamp of temperature limiter class 1
(*only CONDITIONER™ with lighting unit*)

(8) Temperature limiter class 1
(*only CONDITIONER™ with lighting unit*)

3. Scope of delivery, transportation, storage and installation

3.1 Unpacking, and checking equipment and scope of delivery

After having unpacked, please check the unit and its optional accessories, if any, based on the delivery note for completeness and for transportation damage. If transportation damage has occurred, immediately inform the carrier.
The final tests of the manufacturer might cause traces of the racks at the inner surfaces. This has no impact on the function and performance of the unit.

Please remove any transportation protection devices and adhesives in / on the unit and at the doors and take out the operation manuals and accessory equipment.


CAUTION

Sliding or tilting of the unit.
Damage of the unit.

∅ Do NOT lift or transport the unit using either the door handle or the door or at the lower housing.

➢ Lift unit near the 4 unit feet from the pallet by aid of 4 persons.

If necessary to send back the unit, please use the original packing and respect the advice for safe lifting and transportation (chap. 3.2).

For disposal of the transport packing, see chap. 12.1.

3.2 Advice for safe lifting and transportation

Following operation, the unit must be drained off for transport. To pump off the water from the humidifying system, close the water supply, switch on humidity switch (5), and switch on and off the unit twice allowing it each time to run about 2 minutes. Respect the advice for temporal decommissioning (chap. 12.2).


CAUTION

Sliding or tilting of the unit.
Damage of the unit.

➢ Transport the unit only in its original packaging.

➢ Secure the sample conditioning cabinet with transport straps for transport.

∅ Do NOT lift or transport the unit using either the door handle or the door or at the lower housing.

➢ Lift unit near the 4 unit feet by aid of 4 persons.

- Permissible ambient temperature range during transport: -10°C to +60°C.

3.3 Storage

Intermediate storage of the unit is possible in a closed and dry room. Respect the advice for temporal decommissioning (chap. 12.2).

- Permissible ambient temperature range during storage: -10 °C to +60 °C.
- Permissible ambient humidity during storage: max. 70 % RH, non-condensing

Store units only with the humidifying system drained, and ensure the interior is dry. To pump off the water from the humidifying system, close the water supply, switch on humidity switch (5), and switch on and off the unit twice allowing it each time to run about 2 minutes.

CAUTION

Condensation by excess humidity.

Danger of corrosion on the housing after operating at humidity values > 70 % RH for a long period.

➢ Dry the appliance completely before shut-down: Set the humidity to 0 % RH and switch on humidity switch (5). Set the temperature set point to 60 °C for approx. 2 hours (Manual mode). Only then, shut down the unit at the main switch (4).

If following storage in a cold location the unit is transferred to the installation site for start-up, condensation is possible. Wait at least one hour until the chamber has attained ambient temperature and is completely dry.

3.4 Location of installation and ambient conditions

Set up the sample conditioning cabinet on a plane surface, free from vibration at a well-ventilated, dry location and align it using a spirit level. The site of installation must be capable of supporting the unit's weight (see technical data, chap. 13.5).

CAUTION

Danger of overheating.

Damage of the unit.

∅ Do NOT set up units in non-ventilated recesses.

➢ Ensure sufficient ventilation for carrying-off the heat.

- Permissible ambient temperature range: +18 °C to +32 °C. At elevated ambient temperature values, fluctuations in temperature can occur.

The ambient temperature should not be substantially higher than the indicated ambient temperature of +20 °C to which the specified technical data relate. In the case of different ambient conditions, deviations from the indicated data are possible.

With each degree of ambient temperature >20 °C, the refrigeration power decreases by 1.5 K.

- Permissible ambient humidity: 70 % RH max., non-condensing.
- Installation height: max. 2000m above sea level.

A water tap (1 bar to 10 bar) with normal tap water (approx. 200 µS/cm to 500 µS/cm, tolerance range 100 µS/cm to 800 µS/cm) is necessary for the installation of the humidification system (chap. 4.1). Alternatively you can supply water from a pumped water tank, provided that the unit is equipped accordingly (chap. 4.3). Furthermore, a water drain with descending gradient is required (chap. 4.4).

When placing several units of the same size side by side, maintain a minimum distance of 250 mm between each unit. Wall distances: rear 100 mm, sides 160 mm. Spacing above the unit of at least 100 mm must also be accounted for.

CAUTION

Danger by stacking.

Damage of the units.

∅ Do NOT place sample conditioning cabinets on top of each other.

The sample conditioning cabinet Datacolor CONDITIONER™ must not be installed and operated in potentially explosive areas.

DANGER

Explosion hazard.

Danger of life.

∅ Do NOT operate the unit in potentially explosive areas.

∅ NO explosive dust or air-solvent mixture in the ambiance.

4. Installation and connections

The water supply of the CONDITIONER™ can be supplied via standard mains water supply or from a water tank.
Therefore the CONDITIONER™ is supplied in two different versions which cannot be converted easily into the other version.

- Standard units will be connected to the tap of the facility-side water supply (chap. 4.1).Therefore the fresh water connection (H) is carried out as screwed coupling.
- CONDITIONER™ with equipment modification of a supplied “pumped water supply tank” is connected to a water tank, which needs to be filled manually (chap. 4.3). The CONDITIONER™ is equipped with an electromagnetic pump which pumps the water from the external tank into the unit. The fresh water connection (H) is carried out as tube clip.

CAUTION

Danger of bursting tubes and damage of the unit.

∅ Never connect CONDITIONER™ with equipment modification supplied “pumped water supply tank” to pressurized main water supply.

4.1 Mains water supply (connection to a water tap)

An enclosure inside the unit contains the connection kit for mains water and waste water. Install the mains water connection using either the enclosed water hose or another pressure-resistant (> 10 bar) one. The water hose must be heat resistant up to 95 °C. Secure the connection with a hose clamp. Before switching on the unit, check the connection for leaks.

As the appliance only lets in water when required, there is no continuous water flow.

In order to guarantee perfect humidifying, observe the following points with regard to the water supply:

- Supply pressure 1 to 10 bar
- Water type: Tap water with conductivity of 200 µS/cm to 500 µS/cm (tolerance range 100 µS/cm to 800 µS/cm).

  Test: Let boil at least 1 litre of tap water in a suitable pot for 10 minutes in order to precipitate the temporary hardness; then measure the conductivity in the upper half of the volume.

  If the conductivity is between 100 µS/cm and 200 µS/cm large electrodes (DC-5005-0056) have to be installed.

  If the conductivity is between 500 µS/cm and 800 µS/cm an electrode separating plate (DC-6002-0088) has to be installed between the small electrodes.

  If the conductivity outside of the range of 100 µS/cm to 800 µS/cm contact your local Datacolor service representative.
- Total hardness 28.4 mg Ca/l up to 56.8 mg Ca/l.
  In this range of hardness the conductivity is normally between 200 µS/cm and 500 µS/cm. In cases of lower hardness the conductivity is normally too low. In cases of higher hardness the conductivity may be too high. Furthermore the steam generator calcifies faster and more frequent service intervals are necessary.
  But in all cases the conductivity has to be measured as described before. It is possible that the conductivity is in the range of 200 µS/cm and 500 µS/cm and the unit can be operated although the hardness differs.
- Amount of chloride in the water: <100 mg/l
  High amounts of chloride and free chlorine, e.g. from water disinfection, causes strong abrasion of the electrodes.
- Do NOT use softened water (soft water, distilled water, fully desalted water).
- Water intake temperature NOT below +5 °C.
- The mains water intake should be provided with a shut-off slide or water-tap.
- For the water supply, fix the delivered adapter on the thread of the mains water connection (H) at the rear of the chamber and put on the hose
- Protect both the fresh water and the waste water supply at both sides by the delivered hose clamps.

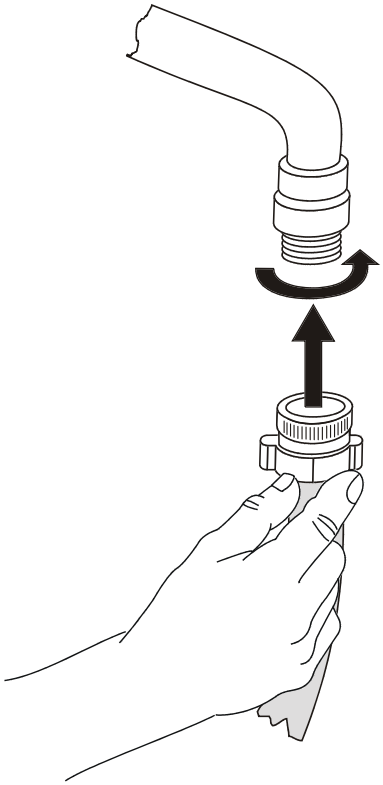
4.1.1 Safety kit for connection CONDITIONER™ – water main

A safety kit against flooding caused by burst water hoses is enclosed to the sample conditioning cabinet. It consists of:

- Hose burst protection device
- Hose nozzle with screwing
- 4 hose clamps
- 6m water hose, divisible for feed hose and the drain

4.1.2 Protection principle of hose burst protection

Whenever a strong water flow of about 18 l/min. occurs, e.g. caused by a burst water hose, a valve automatically cuts off the water supply, what can be heard as a clicking noise. The water supply now remains interrupted until its manual release.



4.1.3 Assembly

Screw the hose burst protection device onto a water tap with a G¾ inch right turning thread connection. The connection is self-sealing. Establish the connection between the safety kit and the chamber with a part of the supplied hose. Protect both ends of the hose by the supplied hose clamps.

We recommend connecting the hose as the last step in order to avoid twisting the hose while screwing on the safety kit.

Open the water tap slowly in order to avoid actuating the hose burst protection device.

4.1.4 Release of the reflux protection device

In case the burst protection device interrupted the water supply, find first the reason and remove it as far as necessary. Close the water tap. Release the valve by a half left-turn of the upper knurled part. You can hear the release of the valve as a clicking noise. Tighten the burst protection device against the water tap by a right turn. Open the water tap slowly afterwards.

4.1.5 Maintenance of the assembly of the hose burst protection device

Calcification can impair valve function. We recommend an annual inspection by a skilled plumper. The plumper should demount the safety kit to check the valve by hand for function and calcification or blockage.

	CAUTION
	Danger of calcification. **Impairment of valve function.** ➢ Have a plumber inspect the valve annually. ➢ Remove calcifications by citric acid or acetic acid solutions. ➢ Afterwards test the function and the tightness of the mounted unit.

Check: Quickly open the water tap while there is no chamber connected – the valve has to cut off the water flux without any delay.

4.2 Hose burst protection device with reflux protection device (option)

For protection of the drinking water system, acc. to DIN 1988 part 4, and against flooding caused by burst water hoses, a safety kit with reflux protection device is available.

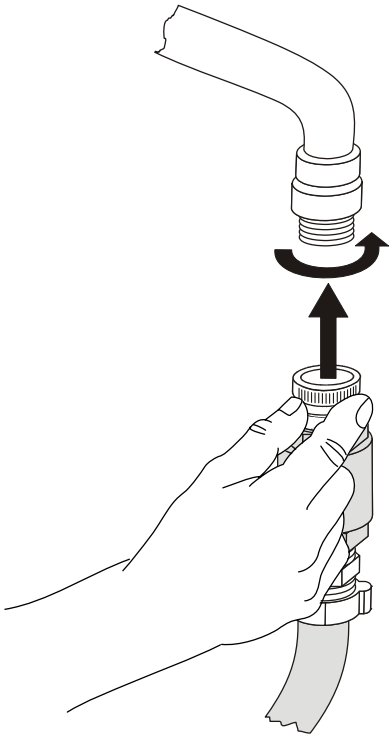
4.2.1 Protection principles

Whenever a strong water flow of about 18 l/min. occurs, e.g. caused by a burst water hose, a valve automatically cuts off the water supply, what can be heard as a clicking noise. The water supply now remains interrupted until its manual release.

An eventual endangering of the drinking water system depends on the risk potential of the charging material. Under unfavourable conditions (e.g. decreasing pressure inside the tap water system), drained off charging material could be sucked out of the chamber via the steam generator into the tap water system and therefore contaminate the drinking water. According to standard DIN 1988, part 4, the safety kit with reflux protection device provides protection in case of short-term utilization of substances with low risk potential. When using substances bearing a higher risk potential, install a one-way valve in order to guarantee absolute protection. It is the user's responsibility to prevent, according to national standards, any reflux of contaminated water into the drinking water system.

4.2.2 Assembly

The regularly delivered original parts – hose burst protection device, hose nozzle with screwing – are not needed. Screw the pre-mounted assembly of hose burst protection device and reflux protection device onto a water tap with a G¾ inch right turning thread connection. The connection is self-sealing. Establish the connection between the safety kit and the chamber with a part of the supplied hose. Protect both ends of the hose by the supplied hose clamps.



We recommend connecting the hose as the last step in order to avoid twisting it while screwing on the safety kit.

Open the water tap slowly in order to avoid actuating the hose burst protection device.

4.2.3 Release of the reflux protection device

In case the burst protection device interrupted the water supply, find first the reason and remove it as far as necessary. Close the water tap. Release the valve by a half left-turn of the upper knurled part. You can hear the release of the valve as a clicking noise. Tighten the burst protection device against the water tap by a right turn. Open the water tap slowly afterwards.

4.2.4 Maintenance of the assembly of hose burst protection device with reflux protection device

Calcification can impair the function of both valves. We recommend an annual inspection by a skilled plumper. The plumper should demount the safety kit with reflux protection device to check the two valves by hand for function and calcification or blockage.

	CAUTION
	Danger of calcification. **Impairment of valve function.** ➢ Have a plumber inspect the two valves annually. ➢ Remove calcifications by citric acid or acetic acid solutions. ➢ Afterwards test the function and the tightness of the mounted unit.

Check: Quickly open the water tap while there is no chamber connected – the valve has to cut off the water flux without any delay.

4.3 Water supply pumped from a water tank (option available when ordering the system cannot be retrofitted)

CAUTION

Danger of bursting tubes and damage of the unit.

∅ Never connect a Datacolor CONDITIONER™ unit supplied water tank to a pressurized mains water supply instead. The unit has a pump inside for pumping water from the non-pressurised water tank. If connected to mains water supply, this may cause damage to the pump, and may cause burst pipes and leaking

The water supply from a pumped water tank replaces the standard mains water supply (connection to a water tap). An electromagnetic pump is located inside the chamber. It switches on when water is required and pumps the water out of the water tank into the humidifying system of the cabinet.

4.3.1 Connection set of the water supply via water tank

- 10 l water supply tank with coupling adapter
- 1.5m PVC tube (12 mm inner diameter) with coupling adapter
- Hose clamps

4.3.2 Connection

The water supply tank is connected to the cabinet by a rapid action hose coupling (self tightened on both sides) and 1.5m hose (12 mm inner diameter). This hose is connected to the cabinet by the white tube clip (H) on the rear side of the cabinet and fastened by the delivered hose clamp.

4.3.3 Freshwater supply

For filling the tank with tap water, the tank must be disconnected from the hose by pulling at the rapid action hose coupling. The temperature of the tap water must not exceed 60 °C. The filled tank should be placed beside the chamber in about the same level as the feet of the cabinet (maximum 1 meter above or below). In any case the tank should be placed in a location that can be observed easily. The connections must be checked for tightness after any filling of the tank.

As the cabinet only lets in freshwater when required, there is no continuous water flow.

The electromagnetic pump is not safe to run dry. Make sure that the water level in the fresh water tank is always sufficient.

In order to guarantee perfect humidifying, observe the following points with regard to the water which is used in the water tank:

- Water type: Tap water with conductivity of 200 µS/cm to 500 µS/cm (tolerance range 100 µS/cm to 800 µS/cm).

  Test: Let boil at least 1 litre of tap water in a suitable pot for 10 minutes in order to precipitate the temporary hardness; then measure the conductivity in the upper half of the volume.

  If the conductivity is between 100 µS/cm and 200 µS/cm large electrodes (DC-5005-0056) have to be installed.

  If the conductivity is between 500 µS/cm and 800 µS/cm an electrode separating plate (DC-6002-0088) has to be installed between the small electrodes.

  If the conductivity is outside of the range of 100 µS/cm to 800 µS/cm contact your local Datacolor service representative.
- Total hardness 28.4 mg Ca/l up to 56.8 mg Ca/l.
  In this range of hardness the conductivity is normally between 200 µS/cm and 500 µS/cm. In cases of lower hardness the conductivity is normally too low. In cases of higher hardness the conductivity may be too high. Furthermore the steam generator calcifies faster and shorter service intervals are necessary.
  But in all cases the conductivity has to be measured as described before. It is possible that the conductivity is in the range of 200 µS/cm and 500 µS/cm and the unit can be operated although the hardness differs.
- Amount of chloride in the water: <100 mg/l
  High amounts of chloride and free chlorine, e.g. from water disinfection, causes strong abrasion of the electrodes.
- Do NOT use softened water (soft water, distilled water, fully desalted water).
- The water intake temperature must lie between 5 °C and 60 °C
- For the connecting the water tank, fix the hose on the hose nozzle of the freshwater connection (H) at the rear of the chamber.
- Protect the hose connections at both sides by the delivered hose clamps.
- If the conductivity of the water is too low (less than 100 µS/cm when using with large electrodes, the water can be treated to increase the conductivity, by adding quantities of Sodium- or Potassium-Sulphate (Na_2SO_4 or K_2SO_4) into the tank until the conductivity is between 300 and 500 µS/cm is reached. Use the standard small electrodes in this case. Note, do NOT use standard salt (NaCl), as this causes accelerated wear of the electrodes because of the free Chlorides.

The waste water drainage can be done as described in chap. 4.4 by connecting the waste water outlet to a siphon of a drain or it can be passed into a 10 l waste water container placed under the waste water connection. In any case the drain must be lead descending.

4.4 Waste water connection

The waste water of the humidifying system of the CONDITIONER™ is automatically pumped out if required.
It can be pumped into a waste water disposal line via a siphon or as an option into a waste water container of approx 10 litres in size.

CAUTION

Backpressure in the humidity module.

Damage of the equipment by excess-voltage.

- ➢ The outlet must be absolutely free of counter-pressure along its entire length
- ➢ Ensure correct installation of the waste water connection.

Fasten the waste water hose to the connection (G) on the provided appliance (tube clip ∅ 14 mm). Observe the following points:

- You can use a part of the delivered tap water hose as a drainage hose. In case another hose is used, it has to be permanently resistant against at least 95°C.
- The waste water hose must be inclined at a gradient of at least 1 cm per meter.
- Never place the waste water hose at a positive inclination because otherwise the humidity module could fill with water during clearing.
- Protect both ends of the drainage hose with two of the four delivered hose clamps.
- Set up the waste water connection via a siphon, if possible ventilated, or via a one way valve, in order to balance air pressure fluctuation in the waste water system and not to transmit it into the steam generator. Pressure fluctuation inside the steam generator can cause humidity fluctuation in the Datacolor CONDITIONER™ inner chamber.
- If using a waste water container, ensure the waste water pipe is firmly connected to the waste water container being used. Check and empty the waste water container regularly
- If using a water tank for water supply instead of water supply direct from the mains, the tank for the waste water should have around the same volume as the tank for the water supply. In this way, if the waste water tank is emptied whenever the supply water tank is refilled there is no possibility of flooding of the waste water tank.
- The waste water tank must be wide and shallow, and must not be too tall, to ensure that the upper fill level in the tank is not higher than the highest level of the water hose

CAUTION

Danger of flooding of the waste water container.

- ➢ In case of fresh water supply via water tap: Check the fill level of the waste water container daily in the morning and in the evening and empty the container in time.
- ➢ In case of fresh water supply via water tank: Empty the waste water container before refilling the fresh water tank.

4.5 Water and connection sets supplied with Datacolor Conditioner systems

4.5.1 Standard Datacolor Conditioner unit with connection to a water tap

Safety kit against flooding caused by burst water hoses, supplied as standard.

Items supplied:

Hose burst protection device to connect to tap	Hose nozzle, with screw connection, to connect to the hose burst protection that is connected to the tap
	
4 hose clamps	6m water hose (PVC black, 12 mm (½'') inner diameter), which should be cut into 2 lengths accordingly, for mains water pipe and waste water pipe. Pressure-resistant up to 10bar, Heat resistant up to 95°C
	

4.5.2 Connection to a water tap using reflux protection device (optional)

Optional hose burst protection device with reflux protection device

For protection of the drinking water system, acc. to DIN 1988 part 4, and protection against flooding caused by burst water hoses, a special safety kit with reflux protection device is available.

Order no. 1085-1019

Reflux protection device	6m water hose (PVC black, 12 mm (½'') inner diameter), which should be cut into 2 lengths accordingly, for mains water pipe and waste water pipe. Pressure-resistant up to 10bar, Heat resistant up to 95°C
	

4.5.3 Datacolor Conditioner unit supplied with pumped water supply tank

Items supplied as standard:

10l Water container, with male pipe connector, fitted onto side of container	1.5m water hose (PVC transparent, 12 mm (½'') inner diameter) with female pip connector, to connect to water tank. Not pressure-resistant, must not be used to connect to mains water supply
	
4 Hose clamps	1.5m water hose (PVC black, 12 mm (½'') inner diameter), to be used for waste water pipe. Pressure-resistant up to 10bar, Heat resistant up to 95°C
	

4.6 Electrical connection

- The sample conditioning cabinet has a fixed mains connection cable (E) 1800 mm in length and a shock-proof plug.
- The unit is equipped with a 10 Amp semi time-lag fine-wire fuse (F) against excess-current:
- Prior to connection and start-up, check the mains voltage. Compare the values to the data specified on the type plate of the unit (unit front behind the door, bottom left-hand)
- When connecting, please observe the regulations specified by the local electricity supply company and as well as the VDE directives (for Germany)
- Pollution degree (acc. to IEC 1010-1): 2
- Over-voltage category (acc. to IEC 1010-1): II

CAUTION

Danger of incorrect mains voltage.

Damage of the equipment.

➢ Check the mains voltage before connection and start-up.

➢ Compare the mains voltage to the data indicated on the type plate.

See also electrical data (chap. 13.5).

5. Start up and switch on the unit

- Open the water-tap for freshwater supply. (Standard CONDITIONER™)
- Fill the water tank with water (CONDITIONER™ with equipment modification “pumped water supply tank”)
- Switch on the humidifying and dehumidifying system with humidity switch (5). Then switching on the unit at the main switch (4) causes changing the water in the steam humidifying system. The waste water is pumping out in 45 seconds, fresh water is automatically let in

  The fresh water needs to be heated first, so after the first switching on the chamber or after an interruption of the power supply the relative humidity will increase only after a delay of about 20 minutes. During this period, the relative humidity can drop considerably.
- Put the main switch (4) in position I.
  The fan starts turning. There is a brief start-up phase in which the display items at the edges of the upper controller display light up successively.

  After a few seconds, the upper display shows the current interior temperature of the CONDITIONER™ and the lower display shows the current interior humidity (see example in Figure 5).

  The lighting LEDs °C and % RH. right of the display that the temperature is shown in °C and the humidity is shown in % RH

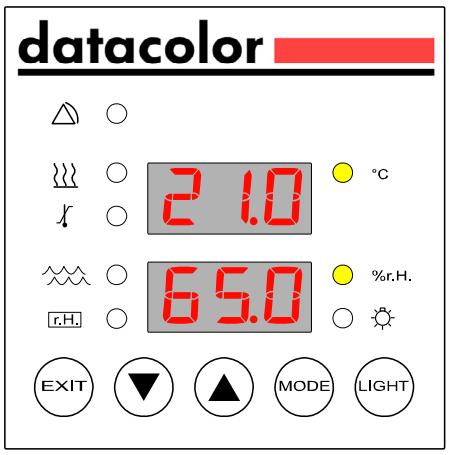


Figure 5: Basic display of the controller

The CONDITIONER™ equilibrates automatically to the last entered set points (Table 3 on page 30 or Table 4 on page 31). The time to equilibrate is approx. 1 hour.

The 2-channel controller RP1 is equipped for controlling two parameters inside the sample conditioning cabinet: temperature and humidity.

Channel 1: Temperature in °C
Channel 2: Relative humidity in % RH

The yellow LED lights up, when the controller switches on the heating.

The yellow LED lights up, when the controller switches on the humidifying system.

- *Only CONDITIONER™ with lighting unit*

  Press button to switch on the illumination.

  The controller sets the light intensity to the last entered set point (Table 3 on page 30).

  The yellow LED is glowing, when the illumination is switched on.

	Behaviour after power failure and shut down The CONDITIONER™ behaves after return of the power supply as during the start up. No warning indicates that a power failure and shut down had been occurred.

6. Setting up the controller RP1

- Press MODE to move from the basic display to the menu for selecting and changing the operating parameters (Table 3 on page 30 or Table 4 on page 31).

  The controller's lower display always shows the parameter type (e.g. SP) and the upper display shows the value associated with that value (e.g. 15.0) (see Figure 6).

  If the value in the upper display is a temperature in °C or a humidity in %RH, the corresponding yellow LED to the right of the display will light up.

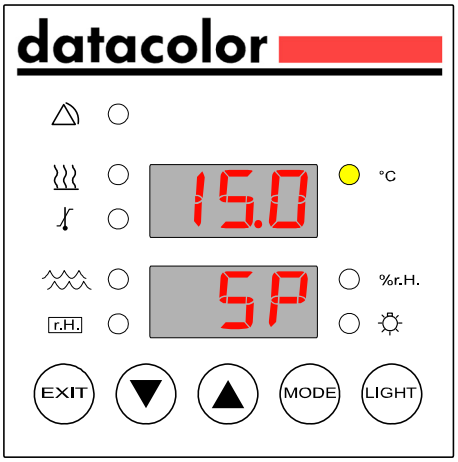


Figure 6: Displaying the parameter for the temperature set point,
lower display: Parameter type, upper display: Value (e.g. in °C)

- Press button MODE to move to the next parameter.

  Pressing the button MODE will confirm the change made to the value of the current parameter and the unit will control towards the new set point.

  To not confirm the changed value wait 30 seconds without pressing any button. The controller will then automatically move back to the basic display without accepting the changed value (see Figure 5).

- To change the values of the parameters press buttons ▲ or ▼ if the buttons are not locked (chapter 6.1 on page31).

  Numerical values can be changed by tenths by pressing ▲ and ▼ for a very short time, and changed by whole numbers by pressing them for longer.

- Press button MODE repeatedly to go back to the basic display (see Figure 5).

  The controller is automatically set back to the basic display if no buttons are pressed within 30 seconds after a parameter is accessed or a value is changed.

☞	If the value of the currently displayed parameter has been changed and the button MODE has not been pressed, the change of the parameter's value is lost by jumping back to the basic display.

Table 3: Operating parameters that can be set at CONDITIONER™ with lighting unit

Symbol	Parameter	Standard Value	Value Range	Note
SP	Temperature set point	21.0°C	10.0 to 50.0°C	Temperature set point for the inner chamber of the CONDITIONER™ If the illumination and the humidification are switched on, the set-point temperature must between 20°C and 50°C. Otherwise no stable humidity control is ensured.
rH	Humidity set point	65.0 %-RH	10.0 to 70.0 % RH	Humidity set point for the inner chamber of the CONDITIONER™ The optimized range for humidity operating is 15°C to 31°C and 38 % RH to 70% RH. Only in this range there is no risk of excessive condensation.
				Outside of the optimized operating range (chap. 8) there is a higher risk of condensation which can trigger the internal residual current operated device and therefore switch off the CONDITIONER™ in case of operating the interior light.
				When the illumination is switched on, the humidity set point must not lower than 30%-RH at 20°C temperature set point. Otherwise no stable control is ensured. To avoid an alarm message during operation without humidity (humidity switch (5) = OFF) set the parameter „rH“ = 0 % RH
int	Light intensity	100%	1% to 100%	Intensity of the illumination.
Al.5	Temperature (absolute limit)	55.0°C	-10.0 to 100.0°C	The safety controller triggers the absolute limit alarm (chapter 8.1.1 on page 35) if this temperature is exceeded. For technical reasons, the absolute limit that is set should be at least 5°C above the temperature set point. If a temperature of 55°C is uncritical for the charging material, it is recommended to leave the setting of the safety controller at the default temperature of 55°C. Otherwise the limit temperature has to readjust every time when the temperature set point is changed.
PA.H	Password	0	0 to 999	3-digit numeric password for locking the operating parameter set up (chap. 6.1, page 31)

Table 4: Operating parameters that can be set at CONDITIONER™ without lighting unit

Symbol	Parameter	Standard Value	Value Range	Note
SP	Temperature set point	21.0°C	10.0 to 90.0°C	Temperature set point for the inner chamber of the CONDITIONER™
rH	Humidity set point	65.0 %-RH	10.0 to 90.0 % RH	Humidity set point for the inner chamber of the CONDITIONER™ To avoid an alarm message during operation without humidity (humidity switch (5) = OFF) set the parameter „rH“ = 0 % RH
Al.5	Temperature (absolute limit)	90.0°C	-10.0 to 100.0°C	The safety controller triggers the absolute limit alarm (chapter 8.1.1 on page 35) if this temperature is exceeded. For technical reasons, the absolute limit that is set should be at least 5°C above the temperature set point. If a temperature of 90°C is uncritical for the charging material, it is recommended to leave the setting of the safety controller at the default temperature of 90°C. Otherwise the limit temperature has to readjust every time when the temperature set point is changed.
PA.H	Password	0	0 to 999	3-digit numeric password for locking the operating parameter set up (chap. 6.1, page 31)

6.1 Locking of the operating parameter set up

To avoid changing of operating parameters by unauthorized persons, the set up mode of the operating parameters can be locked.

- Define 3-digit numeric password via parameter “PA.H” (Table 3 on page 30 or Table 4 on page 31).
- Press the EXIT and MODE buttons simultaneously for 3 seconds to move from the basic display to the menu for selecting the Conditioner’s operation modes. In the upper display the value “OP.H” for “operating mode hand” is displayed (Figure 7).
- Press button ▼ to enter the “operating mode lock”. In the upper display the value “OP.L” for “operating mode lock” is displayed (Figure 7). The value “OP.L” can only be selected, if a password is set via parameter “PA.H” (Table 3 on page 30 or Table 4 on page 31).
- Press button MODE to confirm the change of the operating mode and to go back to the basic display (Figure 5). Changing of operating parameters according to chap. 6 in not possible now.

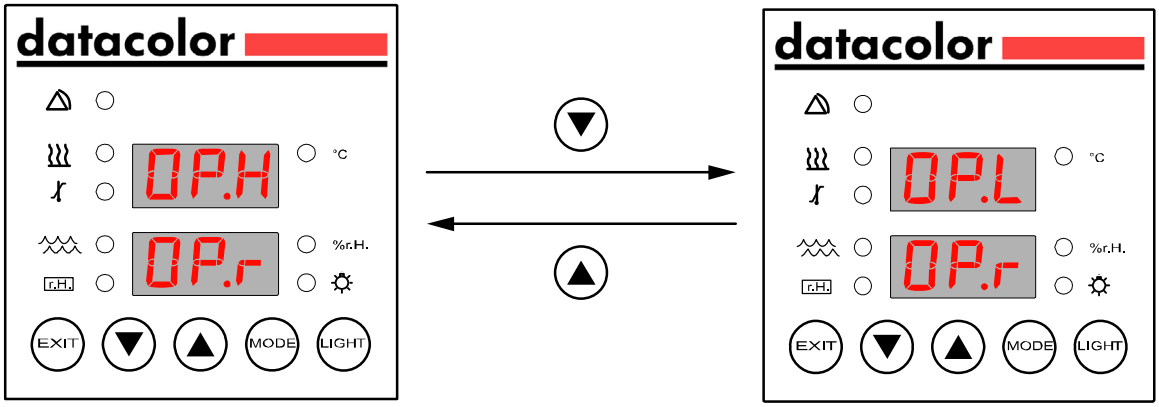


Figure 7: Locking and unlocking of set up mode of the operating parameters

- To unlock press the EXIT and MODE buttons simultaneously for 3 seconds to move from the basic display to the menu for selecting the Conditioner's operation modes
- Press button ▼ to enter the "operating mode hand". In the upper display the value "OP.H" for "operating mode hand" is displayed (Figure 7).
- Press button MODE. The menu to key in the password is displayed (Figure 8).

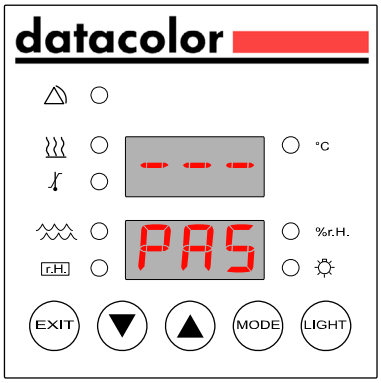


Figure 8: Menu password

- Key in the password by pressing ▲ and ▼ buttons.
- Press button MODE to confirm the change of the operating mode and to go back to the basic display (see Figure 5). Changing of operating parameters according to chap. 6 is temporarily possible: 30 seconds after the last keypad entry, the entry of operating parameters is locked again (operating mode "OP.L"). If you want to permanently unlock the entry, set parameter "PA.H" to 0 (Table 3 on page 30 or Table 4 on page 31).

7. Temperature safety devices

7.1 Electric safety controller (temperature safety device class 3.1)

The sample conditioning cabinet is equipped with an electric over temperature safety device class 3.1 acc. to DIN 12880. It is called "safety controller". It serves to protect the charging material against extensive high temperatures.

The safety controller is electrically independent from the main temperature controller and takes over control when a selectable maximum temperature is reached. This maximum temperature is to be set at the controller via the parameter "AI.5" (Table 3 on page 30 or Table 4 on page 31).

In case the safety controller is activated, an "absolute limit alarm" is triggered (chapter 8.1.1 on page 35). On the upper controller display the message "otc" and the current interior temperature are displayed alternately. Heating, humidification, and illumination (only CONDITIONER™ with lighting unit) are automatically switched off and an alarm sound is emitted which can be muted by hitting controller button EXIT.

When the interior temperature drops by 1°C below the value of the parameter "AI.5", the absolute limit alarm is terminated and the heating resets automatically. On the upper display the current interior temperature is displayed only.

☞	The necessary actions to be taken, if an absolute limit alarm occurs are described in chapter 8.1.1 on page 35)

7.2 Over temperature protective device (temperature limiter class 1)

Only CONDITIONER™ with lighting unit

The CONDITIONER™ with lighting unit is equipped with an internal temperature limiter, class 1 acc. to DIN 12880. It serves to protect the unit and prevents danger caused by considerable defects.

If a temperature of about 66°C is reached, the temperature limiter (8) permanently switches off the unit, the red pilot lamp (7) of the temperature limiter in the lateral control panel lights up, the messages “Etc” and the actual temperature in the inner chamber are displayed alternately on the upper display, and the controller emits an intermittent alarm sound (8.1.4 on page 37). The alarm sound can be muted by hitting controller button EXIT.

When the temperature limiter has responded, check the setting of the safety controller, parameter “Al.5” (chap. 7.1.). The value should be ≤ 55°C (Table 3 on page 30).

	If the value of parameter “Al.5” is ≤ 55°C and nevertheless the temperature limiter class 1 responds, the device is faulty. Take the unit out of operation and have it checked by your local Datacolor service representative to find the cause fort he excessive temperature and the failure of the safety controller (temperature safety device class 3.1).

If the value of parameter “Al.5” is ≥ 66°C, the temperature limiter might have been triggered because the safety controller (temperature safety device class 3.1) has not been set. In this case, you can take the unit into operation again after checking all operating parameters (Table 3 on page 30).

- Let cool down the inner chamber temperature below 55°C.
- Set parameter “Al.5” at the controller to 55°C (chapter 6 on page 29)
- Unscrew the protecting cap of the temperature limiter (8) in the lateral control panel and press down the green push-button below.
- Hit button EXIT to quit he alarm message at the controller.

  The red pilot lamp (7) goes off, and the upper controller display displays only the actual inner chamber temperature.

If the alarm occurs again, please contact your local Datacolor service representative.

7.3 Over temperature protective device (temperature fuse class 1)

Only CONDITIONER™ without lighting unit

The sample conditioning cabinet is equipped with an internal temperature fuse, class 1 acc. to DIN 12880. It serves to protect the unit and prevents danger caused by considerable defects.

If the limit temperature 110 °C is exceeded, the temperature fuse melts and switches off the cabinet permanently. It is not possible to take the cabinet into operation again by the user.

	This temperature fuse is located internally and can only be changed by a service specialist. Contact your local Datacolor service representative.

8. Notifying and alarm functions

8.1 Alarm messages

When operational faults occur at the CONDITIONER™ during normal operations, the controller emits visual and audible alarm messages.

The red LED ⚠ always lights up or flashes when an alarm message is emitted

Table 5: Alarms

Alarm code	Alarm	Description
	Alarm of temperature limit safety controller (auto-resetting)	chapter 8.1.1
	Alarm of temperature tolerance range (auto-resetting)	chapter 8.1.2
	Alarm of humidity tolerance range (auto-resetting)	chapter 8.1.3
	Alarm of temperature limiter class 1 (*only CONDITIONER™ with lighting unit*) (non-auto-resetting)	chapter 8.1.4
	Alarm Illumination off (*only CONDITIONER™ with lighting unit*) (non-auto-resetting)	chapter 8.1.5
	Alarm Rupture of temperature sensor of main controller (auto-resetting)	chapter 8.1.6
	Alarm Rupture of temperature sensor of safety controller (auto-resetting)	chapter 8.1.6
	Alarm Rupture of humidity sensor (auto-resetting)	chapter 8.1.7

If more than one alarm message is sent simultaneously, they are displayed in a cycle except for alarms 995 to 999. These take priority over all of the controller's other operational displays and alarm signals.

Except for the tolerance range alarms, all the alarms are displayed immediately the reason for the fault occurs. The “tolerance range alarms” are each suppressed for 20 minutes after switching on the unit or after the chamber door has been opened.

You can use button EXIT to switch off the audible alarm signals. The visual alarm display is only removed when the reason for the fault has been remedied or the parameter being monitored returns to within its tolerance limits.

8.1.1 Alarm of temperature limit safety controller

Safety controller temperature alarm

The set temperature limit (parameter “Al.5”) has been exceeded (Table 3 on page 30 or Table 4 on page 31).

- Alarm message emitted immediately
- Audible alarm: buzzer (ongoing sound)
- Visual display:

LED		Upper display, changing content	
		Actual temperature	Alarm code
⚠	flashes		
🌡	permanently lit		

- **Measures**
  1. Check the setting of the temperature limit (parameter “Al.5”) (Table 3 on page 30 or Table 4 on page 31).

     The value of parameter “Al.5” should be at least by 5 °C above the value of parameter “SP”.

     If necessary, change this parameter.
  2. Check whether samples were inserted into the chamber that produces heat under the climate conditions in the device.
  3. Check the ambient temperature.

     The ambient temperature must be below 32°C.

     The unit must be protected against direct sunlight.

     The installation location must be sufficiently ventilated to prevent any build-up of heat in the device.
  4. If you can exclude points 1. to 3. as the source of the fault, the device might be faulty. Please contact your local Datacolor service representative.

8.1.2 Alarm of temperature tolerance range

Main controller temperature alarm.

The set-point temperature (parameter “SP”) has been exceeded or fallen below by more than 2°C for more than 20 minutes.

- Audible alarm: buzzer (intermittent sound)
- Visual display:

LED		Upper display, changing content	
		Actual temperature	Alarm code
⚠	flashes		
🌡	flashes		

- **Measures**
  1. Check the ambient temperature. The ambient temperature must lie between 18 and 32°C.
  2. Regarding to the displayed actual temperature, check if the set-point temperature (parameter “SP”) has been exceeded or fallen below.
  3. Check if a prolonged door opening has caused the temperature deviation. In this case, no further actions are required. If appropriate, mute the buzzer.

Temperature too low:

4. Check if the chamber door is closed properly.
5. Check the door gaskets for damage. Replace any damaged gaskets.

Temperature too high:

6. Check whether samples were inserted into the chamber that produces heat under the climate conditions in the device.

   The unit must be protected against direct sunlight.

   The installation location must be sufficiently ventilated to prevent any build-up of heat in the device.
7. If you can exclude points 1. to 6. as the source of the fault, the device might be faulty. Please contact your local Datacolor service representative.

8.1.3 Alarm of humidity tolerance range

Main controller humidity alarm.

The set-point humidity (parameter “rh”) has been exceeded or fallen below by more than 5% RH for more than 20 minutes.

- Audible alarm: buzzer (intermittent sound)
- Visual display:

LED		**Lower display, changing content**	
		Actual humidity	**Alarm code**
△	flashes		
r.H.	flashes		

- **Measures**

  1. Regarding to the displayed actual humidity, check if the set-point humidity (parameter “rh”) has been exceeded or fallen below.
  2. Check if a prolonged door opening has caused the humidity deviation. In this case, no further actions are required. If appropriate, mute the buzzer.

  Humidity too low:

  3. When operating without humidity, humidity switch (5) = OFF, set controller parameter “rh” to 0% r.H.
  4. Check if the chamber door is closed properly.
  5. Check the door gaskets for damage. Replace any damaged gaskets.
  6. If you can exclude points 2. to 5. as the source of the fault, the device might be faulty. Please contact your local Datacolor service representative.

8.1.4 Alarm of temperature limiter class 1

Only CONDITIONER™ with lighting unit

The temperature limiter class 1 (DIN 12880) responds.

- Alarm message emitted immediately
- Audible alarm: buzzer (intermittent sound)
- Visual display (alarm message displayed immediately):

LED	Upper display, changing content	
	Temperature	Alarm code
△ flashes	60.0	Etc

- **Measures**

1. Check the setting of the temperature limit, parameter “Al.5”. The value should be ≤ 55°C.

   If the value of parameter „Al.5“ is ≤ 55°C and nevertheless the temperature limiter class 1 responds, the device is faulty. Take the unit out of operation and have it checked by your local Datacolor service representative to find the cause for the excessive temperature and the failure of the safety controller (temperature safety device class 3.1).

   If the value of parameter “Al.5” is ≥ 66°C, the temperature limiter might have been triggered because the safety controller (temperature safety device class 3.1) has not been set. In this case, you can take the unit into operation again after checking all operating parameters (Table 3 on page 30). If the alarm occurs again, please contact your local Datacolor service representative.

8.1.5 Alarm Illumination off

Only CONDITIONER™ with lighting unit

The illumination was automatically switched off because the inner chamber temperature of 55°C or the relative humidity of 75%-r.H. were exceeded.

- Alarm message emitted immediately
- Audible alarm: buzzer (intermittent sound)
- Visual display:

LED	Lower display, changing content	
	Relative humidity	Alarm code
△ flashes	60.0	Lit
☼ flashes		

- **Measures**

1. Check the setting of the temperature limit, parameter “Al.5”. The value should be ≤ 55°C.
2. Check if very humid charging material has caused the rise of humidity >75 % r.H. If yes, open the unit for a short while and start again.
3. If you can exclude points 1 and 2 as the source of the fault, switch off the unit and have it checked by your local Datacolor service representative.

8.1.6 Alarm Rupture of temperature sensors

A sensor rupture alarm display takes priority over all of the controller's other operational displays and alarm messages.

- Alarm message emitted immediately
- Audible alarm: buzzer (intermittent sound)
- Visual display:

LED	Upper display, flashing alarm code	Signification
⚠ flashes		Failure of the main controller temperature sensor: All heating switched off. Refrigerating system switched off.
		Failure of the safety controller temperature sensor: All heating switched off. Illumination switched off. Humidification switched off. Dehumidification continues.

- **Measures**

  Switch off the unit and please contact your local Datacolor service representative.

8.1.7 Alarm Rupture of humidity sensor

A sensor rupture alarm display takes priority over all of the controller's other operational displays and alarm messages.

- Alarm message emitted immediately
- Audible alarm: buzzer (intermittent sound)
- Visual display:

LED	Lower display, flashing alarm code	Signification
⚠ flashes		Failure of the humidity sensor: Humidification switched off. Dehumidification continues.

- **Measures**

  Switch off the unit and please contact your local Datacolor service representative.

8.2 Error messages

During controller operation and when switching on the unit or changing the operating mode, error messages can occur, which are caused by internal controller faults.

- Visual display (examples):

LED	Upper display,	Lower display
⚠ flashes		
⚠ flashes		
⚠ flashes		
⚠ flashes		

- **Measures**
  1. Switch off the unit at the main switch.
  2. Pull the power plug.
  3. Wait 1 minute.
  4. Plug in the mains plug again.
  5. Switch on the unit at the main switch.
  6. If the error message occurs again, the device might be faulty. Please contact your local Datacolor service representative.

9. Humidifying and dehumidifying system

The humidifying and dehumidifying system serves to humidify the atmosphere inside the chamber up to a preselected value. It consists of three main components:

- Humidity sensor to measure the relative humidity inside the unit.
- Humidifying system to generate steam using two electrodes. Inside a water basin the electrodes generate steam, which is conducted into the inner chamber.
- Evaporator plates of the cooling system to dehumidify the air of the inner chamber

	Following opening of the glass door or a water exchange in the steam cylinder, humidity can markedly fall below its set-point during 10 to 30 minutes.

The Datacolor CONDITIONER™ sample conditioning cabinet is equipped with a door heating system to prevent condensation in the door area.

Due to the construction of the CONDITIONER™ no icing occurs in the inner chamber during de dehumidification.
The unit can be operated permanently without manual defrosting.

9.1 Humidifying and dehumidifying system of CONDITIONER™ with lighting unit

The control of temperature and humidity of this unit is optimized to a working point 21°C/65% RH. The fluctuations at this point are ± 0.5°C and ± 2.0 % RH

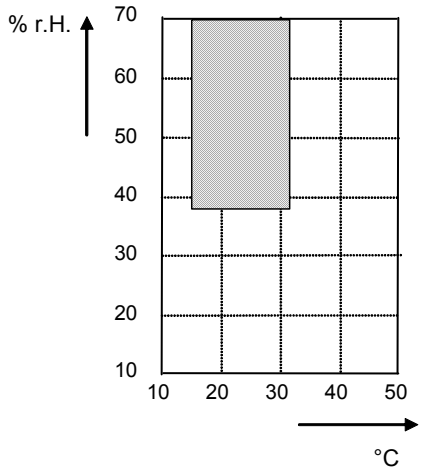


Figure 9: Temperature-humidity-diagram of CONDITIONER™ with lighting unit
(Hatched area: optimized operating range of the humidity system)

The CONDITIONER™ with lighting unit can be operated within an optimized operating range of 15°C to 31°C and 38 % RH to 70% RH in a stable manner and without excessive condensing (Figure 9).

Switching on the illumination modifies the operating range, and the humidity set-point at 20°C must not be lower than 30 % RH, otherwise stable humidity control is not guaranteed.

	Outside the optimized operating range there is increased risk of condensation, which can trigger the internal residual current operated device if the illumination is switched on and thus cause switching off the unit. The residual current operated device permanently switches off-tension the unit as soon as the residual current exceeds 30 mA.

9.2 Humidifying and dehumidifying system of CONDITIONER™ without lighting unit

The CONDITIONER™ without lighting unit can be operated within an optimized operating range according to the temperature-humidity-diagram (Figure 10) in a stable manner and without excessive condensing.

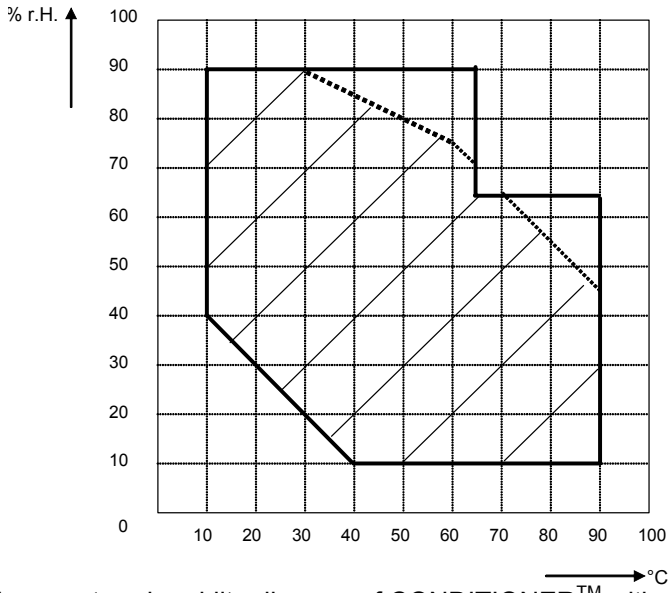


Figure 10: Temperature-humidity-diagram of CONDITIONER™ without lighting unit
(Hatched area: optimized operating range of the humidity system)

- Area inside the frame:
  Control range of temperature and relative humidity
- Hatched area
  Control range of temperature and relative humidity without condensation in the inner chamber.

If the set points for temperature or humidity are outside the optimum range, condensation can arise in the door area.

CAUTION

Condensation by excess humidity.

Danger of corrosion on the housing after operating at humidity values > 70 % RH for a long period

➢ Dry the appliance completely before shut-down:

- Set the humidity to 0 % RH and switch on humidity switch (5).
- Set the temperature set point to 60°C for approx. 2 hours (Manual mode).
- Only then, shut down the unit at the main switch (4).

10. Lighting unit of the CONDITIONER™

The Datacolor CONDITIONER™ with lighting unit is equipped with 2 illumination cassettes with 2 fluorescent tubes. The light color with UVA portion is close to the spectrum of artificial sunlight D65 ISO 10977:

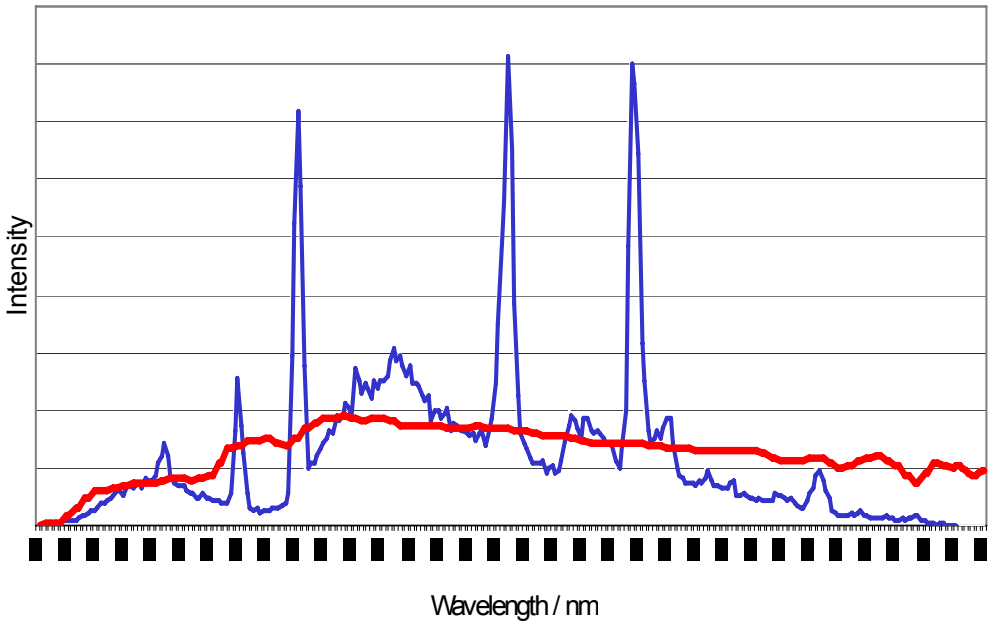


Figure 11: Spectrum

Fluorescent tube light color 955 (Narva) or 172 (Sylvania)
D65 ISO 10977

Illumination at 100 % intensity: 3231 LUX (average value below the fluorescent tubes at a distance of 135 mm):

A special reflector material ensures optimum light diffusion and efficient utilization of the light intensity.

	To achieve maximum light homogeneity on the samples, keep them in a distance of at least 10 cm from the side walls.

All fluorescent tubes are turned on by pushing LIGHT at the controller panel. When the illumination is switched on, the yellow LED glows.

Light intensity can be set at the controller via parameter “int” between 1% and 100% (Table 3 on page 30).

	The illumination is automatically switched off if the inner chamber temperature of 55°C or the relative humidity of 75% r.H. is exceeded. The lower controller display displays alternately the message “Lit” and the actual humidity, LED flashes, and the controller emits an intermittent alarm sound (chapter 8.1.5 on page 37). You can reset the alarm only if the inner chamber temperature is < 55°C and the relative humidity is < 75 % r.H. You can mute the acoustical alarm at any time independently of the humidity by hitting controller key EXIT. When the illumination is switched on, the set-point humidity at 20°C must not be lower than 30 % r.H. because otherwise no stable control is guaranteed.

10.1 Counter of operating hours

The counter of operating hours (6) situated in the lateral control panel is running when the illumination is switched on. It cannot be reset to zero. Therefore we recommend noting down the number of operating hours reached in the maintenance protocol or the operating book when replacing the fluorescent tubes.

11. Maintenance, cleaning, and service

11.1 Maintenance intervals, service

DANGER

Electrical hazard.

Danger of life.

- ➢ Put off-circuit the unit before conducting maintenance work. Pull the power plug.
- ∅ The unit must NOT become wet during operation or maintenance works.
- ➢ Have all maintenance work conducted by a Datacolor engineer or an engineer authorized by Datacolor

Have conducted regular maintenance work carried out at least once a year.

Have conducted regular maintenance work on the steam humidifier carried out at least once a year. The operating behavior and the maintenance intervals of the humidifier essentially depend on the available water quality and the amount of steam produced in the meantime.

The first maintenance should be performed after operating for about 20 weeks if the water quality is normal. Deviating water quality can lengthen or shorten the interval.

	The electrodes are subject to normal operational wear and can be replaced. Their lifetime depends on the aggressiveness of the water available and the number of hours of operation.

	Change the door gasket in cold condition only. Otherwise the door gasket will be damaged.

11.2 Replacement of the fluorescent tubes

Only CONDITIONER™ with lighting unit

The average life expectancy of the fluorescent tubes is about 10,000 hours. After that time the tubes should be replaced.
You can read the operating time of the fluorescent tubes off the counter of operating hours (6). The counter cannot be reset to zero. Therefore we recommend noting down the number of operating hours reached in the maintenance protocol or the operating book when replacing the fluorescent tubes.

11.3 Cleaning and decontamination

DANGER

Electrical hazard.

Danger of life.

∅ Do NOT spill water or cleaning agents over the inner and outer surfaces.

➢ Put off-circuit the unit before cleaning. Pull the power plug.

➢ Completely dry the appliance before switching it on again.

11.3.1 Cleaning

- Disconnect the chamber from the mains before cleaning. Pull the power plug!
- Wipe the surfaces with a moistened towel. In addition, you can use the following cleaning agents:

Exterior surfaces, inner chamber, racks, door gaskets	Standard commercial cleaning detergents free from acid or halogenides. Alcoholic solutions.
Instrument panel	Standard commercial cleaning detergents free from acid or halogenides.

	For surface protection, perform cleaning as fast as possible. After cleaning completely remove cleaning agents from the surfaces with a moistened towel.

11.3.2 Decontamination

- Disconnect the chamber from the mains prior to decontamination. Pull the power plug.
- You can use the following disinfectants:

Inner chamber	Standard commercial surface disinfectants free from acid or halogenides. Alcoholic solutions.

In case of impurity of the interior with biological or chemical hazardous goods, there are two possible procedures depending on the type of contamination and of the charging material.

1. Spray the inner chamber with an appropriate disinfectant.
   Before start-up, the unit must be absolute dry and ventilated, because explosive gases might form during the decontamination process.
2. If necessary, have strongly contaminated inner chamber parts removed by an engineer for cleaning, or have them exchanged. Sterilize the inner chamber parts in a sterilizer or autoclave.

	With every decontamination method, ensure adequate personal safety.

CAUTION

Danger of corrosion.
Damage of the unit.

Do NOT use acidic or chlorine cleaning detergents.

12. Disposal

12.1 Disposal of the transport packing

Packing element	Material	Disposal
Straps to fix packing on pallet	Plastic	Plastic recycling
Pallet	Solid wood (IPPC standard)	Wood recycling
Transport box with metal clamps	Cardboard	Paper recycling
	Metal	Metal recycling
Foamed plastic stuffing (pallet, top cover)	PE foam	Plastic recycling
Top cover	Cardboard	Paper recycling
Edge protection	Styropor®	Plastic recycling
Protection of doors and racks	PE foam	Plastic recycling
Bag for operation manual	PE foil	Plastic recycling
Insulating air cushion foil (packing of optional accessories)	PE foil	Plastic recycling

If recycling is impossible, all packing parts can also be disposed of in the household waste.

12.2 Decommissioning

To pump off the water from the humidifying system, close the water supply, switch on humidity switch (5), and switch on and off the unit twice allowing it each time to run about 2 minutes.

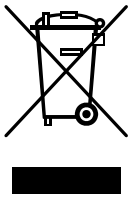
Switch off main switch (4) and humidity switch (5). Disconnect the unit from the mains. Remove the water installation.

- Temporal decommissioning: See indications for appropriate storage, chap. 3.3.
- Final decommissioning: Dispose of the unit as described in chap.12.3 or 12.4.

12.3 Disposal of the unit in the member states of the EC

According to directive 2002/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE), Datacolor CONDITIONER™ units are classified as “monitoring and control instruments” (category 9) only intended for professional use“. They must not be disposed of at public collecting points.

The sample conditioning cabinet Datacolor CONDITIONER™ bears the symbol for the marking of electrical and electronic equipment manufactured / placed on the market in the EC after 13 August 2005 and should be disposed of in separate collection according to the directive 2002/96/EC on waste electrical and electronic equipment (WEEE). WEEE marking: crossed-out wheeled bin with solid bar under.



After the end of utilization, notify the distributor who sold you the device, who will take back and dispose of the unit according to the directive 2002/96/EC of 27 January 2003 on waste electrical and electronic equipment (WEEE).

CAUTION

Violation against existing law.

∅ Do NOT dispose of Datacolor CONDITIONER™ units at public collecting points.

➢ Have the device disposed of professionally at a recycling company which is certified according to conversion of the directive 2002/96/EC into national law.

Certified companies disassemble waste Datacolor equipment in primary substances for recycling according to directive 2002/96/EC by. In order to exclude any health hazard for the employees of the recycling companies, the devices must be free from toxic, infectious or radioactive substances.

It is the user’s responsibility that the unit is free from toxic, infectious or radioactive substances prior to handing it over to a recycling company.

- Prior to disposal clean the unit from all introduced or sticking toxic substances.
- Prior to disposal disinfect the unit from all sources of infection. Be aware of the fact that sources of infection might be located as well outside the inner chamber.
- If you cannot safely free the unit from toxic substances and sources of infection, dispose of it as special waste according to national law.

WARNING

Contamination of the device with toxic, infectious or radioactive substances.

Danger of intoxication.

Danger of infection.

∅ NEVER lead a unit with sticking toxic substances or sources of infection to recycling according to directive 2002/96/EC.

➢ Prior to disposal, free the unit from sticking toxic substances or sources of infection.

➢ Dispose of a unit which you cannot safely free from all toxic substances or sources of infection as special waste according to national law.

12.4 Disposal of the unit in non-member states of the EC

CAUTION

Alteration of the environment.

- Observe the regulations under public law for appropriate disposal protecting the environment.

The refrigerant used R134a (1,1,1,2-tetrafluorethane) is not inflammable at ambient pressure. It must not reach the environment. Professionally suck the refrigerant off the refrigeration cycle and dispose of it according to the national regulations. 210g of refrigerant is used in CONDITIONER™ with lighting unit and 165g of refrigerant is used in CONDITIONER™ without lighting unit

13. Technical description

13.1 Factory calibration and adjustment

This unit was calibrated and adjusted in factory. Calibration and adjustment were performed using standardized test instructions, according to the QM-system of DIN EN ISO 9001 applied by (certified since December 1996 by TÜV CERT). All test equipment used is subject to the administration of measurement and test equipment that is also constituent part of the QM-systems of DIN EN ISO 9001. They are controlled and calibrated in relation to a DKD-Standard on regular intervals.

13.2 Over current protection

The devices are protected by one miniature fuse (F) against over current, accessible from the outside. The miniature fuse is located at the rear of the chamber below the strain relief of the power cord. The fuse holder is equipped with a fuse clip 5 mm x 20 mm. The fuse may be replaced only with a substitute of the same ratings. Refer to the technical data of the respective device type. If the fuse is blown, please inform an electronic engineer or contact your local Datacolor service representative.

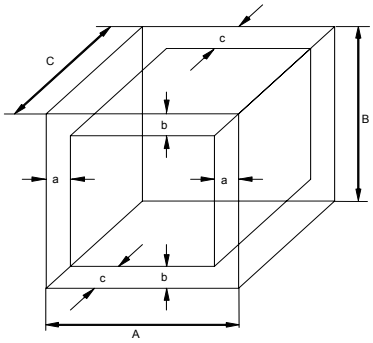
13.3 Residual current operated device

Only CONDITIONER™ with lighting unit

The CONDITIONER™ with lighting unit is equipped with an internal residual current operated device. It protects the user against dangers resulting from condensation in the inner chamber. If the residual current operated device responds, the unit is without any function. Please inform an electronic engineer or contact your local Datacolor service representative.

13.4 Definition of usable space

The usable volume illustrated below is calculated as follows:



A, B, C = internal dimensions (W, H, D)
a, b, c = wall separation

a = 0.1*A
b = 0.1*B
c = 0.1*C

V_{USE} = (A - 2 * a) * (B - 2 * b) * (C - 2 * c)

Figure 12: Determination of the useable volume

The technical data refer to the so defined usable space.

- Do NOT place samples outside this usable volume.
- Do NOT load this volume more than half to enable sufficient airflow inside the chamber.
- Do NOT divide the usable volume into separate parts with large area samples.
- Do NOT place samples too close to each other in order to allow circulation between them and thus obtain a homogenous distribution of temperature and humidity.

13.5 Technical Data Datacolor CONDITIONER™

Datacolor CONDITIONER™		RP1 controller with lighting	RP1 controller without lighting
Exterior dimensions			
Width	mm / *inch*	834 / *32.83*	834 / *32.83*
Height (incl. feet/roller)	mm / *inch*	1022 / *40.24*	1022 / *40.24*
Depth	mm / *inch*	647 /*25.47*	647 /*25.47*
incl. door handle, I-triangle, connection	mm / *inch*	100 / *3.94*	100 / *3.94*
Wall clearance rear	mm / *inch*	100 / *3.94*	100 / *3.94*
Wall clearance side	mm / *inch*	160 / *6.30*	160 / *6.30*
Steam space volume	l / cu.ft.	158 / *5.58*	158 / *5.58*
Height of water connections	± 3 mm	84 / 3.31	84 / 3.31
Number of doors	pieces	1	1
Number of inner glass doors	pieces	1	1
Interior dimensions			
Width	mm / *inch*	600 / *23.62*	600 / *23.62*
Height	mm / *inch*	480 / *18.90*	480 / *18.90*
Depth	mm / *inch*	400 / *15.75*	400 / *15.75*
Interior volume	l / cu.ft.	115 / *4.1*	115 / *4.1*
Number of racks	standard / max.	2 / 2	2 / 5
Load per rack	kg / *lbs.*	20 / *44*	20 / *44*
Permitted total load	kg / *lbs.*	50 / *110*	50 / *110*
Weight (empty)	kg / *lbs.*	126 / 278	115 / *254*
Temperature data			
Adjustable temperature range	°C / *°F*	10 up to 50 / *50 to 122*	10 up to 90 / *50 to 194*
Temperature fluctuation at 21°C/65% RH	± °C	0,4 1)	0,5
Cooling data			
Refrigerant R134a	g	210	165
Theoretical maximum cooling power	W	605	605
Humidity data			
Adjustable humidity range	% RH	10 up to 70	10 up to 90
Humidity fluctuation at 21°C/65% RH 2)	± % RH	2	1,5
Light data			
Illumination at 100% intensity (average value below the fluorescent tubes at a distance of 135 mm)	LUX	3231	N/A
Electrical data			
IP system of protection acc. to EN 60529		20	20
Nominal voltage (±10 %) 50/60 Hz	V	230 1N~	230 1N~
Nominal power	W	1500	1400
Energy consumption at 37°C 3)	W	-	530
Energy consumption at 21°C, 65 % RH, ambient temp. 25°C without illumination 3)	W	563	-
Energy consumption at 21°C, 65 % RH, ambient temp. 25°C with illumination 3)	W	533	-
Installation category acc. to IEC 1010-1		II	II
Pollution degree acc. to IEC 1010-1		2	2
Miniature fuse (M) 230 V / 5 x 20 mm	A	10	10
Residual current operated device	A	0.03	-

Legend:

1. The temperature data were determined by a 9-point measurement in a distance of 135 mm to the light cassettes below the fluorescent tubes at 21 °C / 65 % RH
2. Upon door opening or water exchange in humidity cylinder > 1,5% r.H, recovery time approx. 20 min.
3. Use this value for dimensioning air condition systems.

All technical data are specified for units with standard equipment at an ambient temperature of +21 °C / 65 %RH and a mains voltage fluctuation of ±10. The temperature data are determined in accordance to DIN 12880, part 2, respecting the recommended wall clearances of 10 % of the height, width and depth of the inner chamber.

All indications are average values, typical for units produced in series. We reserve the right to alter technical specifications at all times.

	If the chamber is fully loaded, the specified heating up and cooling down times may vary according to the load.

	Bringing in a humidity source to the inner chamber affects the minimal humidity range.

13.6 Equipment

	To operate the sample conditioning cabinet, use only original Datacolor accessories or accessories of third-party suppliers authorized by Datacolor. The user is responsible for any risk when using unauthorized accessories.

Microprocessor controller with 2-channel technology for temperature and humidity
Electronic safety controller (temperature safety device) class 3.1 acc. to DIN 12880
Only CONDITIONER™ with lighting unit: Temperature limiter 66 °C, class 1 acc. to DIN 12880
Only CONDITIONER™ without lighting unit: Temperature fuse 110 °C, class 1 acc. to DIN 12880
Inner glass door
DCT® refrigerating system with refrigerant R134a
Microprocessor controlled humidifying and dehumidifying system
Only CONDITIONER™ with lighting unit: 2 illumination cassettes, one fix and one flexible

13.7 Dimensions Datacolor CONDITIONER™

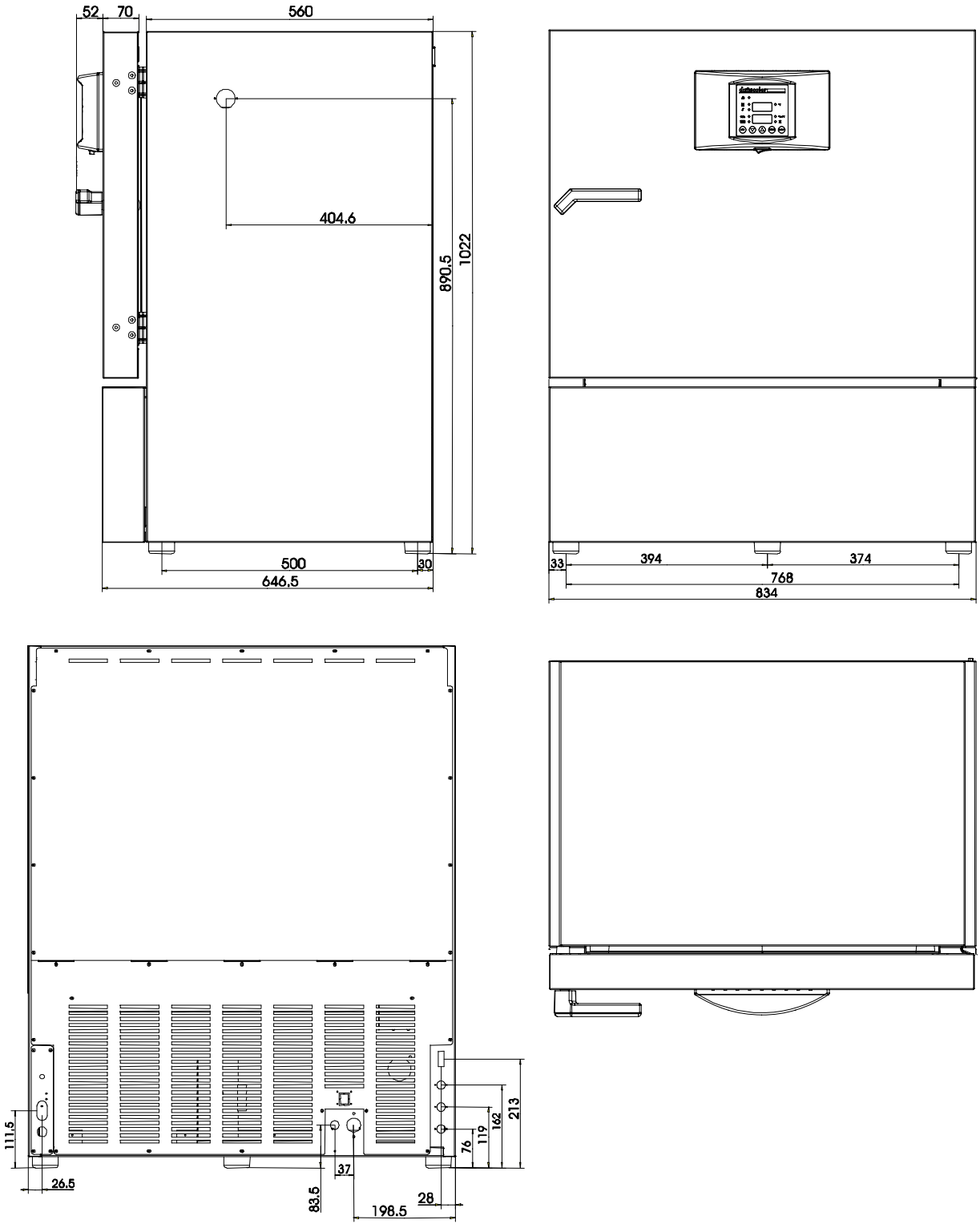


Figure 13: Dimensions Datacolor CONDITIONER™