



Forma Environmental Chamber

Model 3909 and 3942 Operating Manual

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Safety Notes

Explanation of the Safety Information and Symbols

Safety notes and symbols used throughout these operating instructions



Indicates a hazardous situation which, if not avoided, will result in death or serious injuries.



Indicates a hazardous situation which, if not avoided, could result in death or serious injuries.



Indicates a situation which, if not avoided, could result in damage to equipment or property.

NOTE

Is used for useful hints and information regarding the application.

Additional Symbols for Safety Information

Important operating and/or maintenance instructions. Read the accompanying text carefully.



Potential electrical hazards. Only qualified persons should perform procedures associated with this symbol.



Equipment being maintained or serviced must be turned off and locked off to prevent possible injury.





WEEE Compliance: Thermo Fisher Scientific has contracted with companies for recycling/disposal in each EU Member State. For further information, send an email to wEEE.recycle@thermofisher.com.

For any activity on the environmental chamber:

- ✓ Always use the proper protective equipment (clothing, gloves, goggles, etc.)
- ✓ Always dissipate extreme cold or heat and wear protective clothing.
- ✓ Always follow good hygiene practices.
- ✓ Each individual is responsible for his or her own safety.

Basic Operating Precautions

These operating instructions describe environmental chambers.

The environmental chambers have been manufactured to the latest state of the art and have been tested thoroughly for flawless functioning prior to shipping. However, the environmental chambers may present potential hazards, particularly if it is operated by inadequately trained personnel or if it is not used in accordance with the intended purpose.

Therefore, the following must be observed for the sake of accident prevention:

- Never step into the unit.
- The environmental chambers must be operated by adequately trained and authorized professional personnel.
- The environmental chambers must not be operated unless these operating instructions have been fully read and understood.
- For any operation of this device, the operator must prepare clear and concise written instructions in the language of the operating and cleaning personnel based on these operating instructions, applicable safety data sheets, plant hygiene guidelines, and technical regulations, in particular:
 - The decontamination measures to be employed for the environmental chamber and the accessories used with it.
 - The safety precautions to be taken when processing specific agents.
 - Wearing protective equipment when handling e.g. microbiological and biological samples.
 - The measures to be taken in case of accidents.
- Repair work on the environmental chamber must be carried out only by trained and authorized expert personnel.

- Disconnect the unit from all power sources before cleaning, troubleshooting, or performing other maintenance on the product or its controls. To disconnect power supply to the environmental chamber, unplug the supply cord at the back of the chamber. Note that deactivating the main switch on the front control panel to the Off position is not sufficient to disconnect power.
- The contents of these operating instructions are subject to change at any time without further notice.
- Keep these operating instructions close to the environmental chamber so that safety instructions and important information are always accessible.



Humidity

After transport and decommissioning, or storage under humid conditions a drying-out process must be performed. During the drying-out process the equipment cannot be assumed to meet all the safety requirements of the IEC 61010-2-010 standard. The drying-out period is 2 hours.

- Should you encounter problems that are not detailed adequately in these operating instructions, please contact Thermo Fisher Scientific immediately for your own.

Operational Safety Rules

The following rules must be heeded when working with environmental chambers:

- Observe the sample weight limits specified for your environmental chambers, whole and its shelving in particular; see “Specifications” on page 12-1.
- Arrange the samples evenly throughout the work space, making sure not to place them too closely to the interior walls to ensure a uniform temperature distribution.
- Do not load your environmental chambers with substances that exceed the capabilities of the available lab apparatus and personal protection equipment to provide sufficient degrees of protection to users and third parties.
- Check the door seal every 12 months for proper sealing performance and possible damage.
- Do not process any samples containing hazardous chemical substances that may be released into the ambient air through defective seals or may cause corrosion or other defects on parts of the environmental chamber.
- The tempering of defined substances or materials with higher moisture content can result in increased condensation in the chamber. Measures must be observed.
- The user is responsible for carrying out appropriate decontamination procedures when hazardous materials are spilled on or inside the environmental chamber.



If the environmental chamber is not used in the manner specified in this operating manual, the protection provided by the equipment design maybe impaired.

Warranty

Thermo Fisher Scientific warrants the operational safety and functions of the environmental chambers only under the condition that:

- The environmental chamber is operated and serviced exclusively in accordance with its intended purpose and as described in these operating instructions.
- The environmental chamber is not modified.
- Only original spare parts and accessories that have been approved by Forma are used (third-party spares without Forma approval void the limited warranty).
- Inspections and maintenance are performed at the specified intervals.
- An operation verification test is performed after each repair activity.

Intended Use

Forma Environmental Chambers with light option are laboratory devices intended for

- Stability testing,
- Shelf life studies, packaging testing,
- Light stability testing,
- Cultivation of: cells, tissue, micro organism cultures for research only,
- Plant growth,
- Hatching of insects, fish or other animals and microorganisms that require light exposure,
- Refrigerated storage or long term storage of substances and samples.

The devices employ:

- Precision temperature control - above or below and above ambient temperature, depending on model
- Precision humidity control: some models only
- On option: Precision CO₂ control
- On option: Light control for day/night simulation and light stability testing for simulating the specific physiological ambient conditions for these cultures, organisms and test or storage applications acc., ICH guideline.

Unintended Use

The appliance is not explosion-proof. To avoid the risk of explosion do not load the environmental chamber with tissue, material or liquids that:

- are easily flammable or explosive,

- release vapor or dust that forms combustible or explosive mixtures when exposed to air,
- release poisons,
- release dust,
- exhibit exothermic reactions,
- are pyrotechnical substances,
- cultivation of: human cells for diagnostics of diseases.

Refrain also from pouring any liquids onto the internal base plate.

Standards and Directives

- UL 61010-1, 3rd Edition, May 11, 2012, Revised April 29, 2016,
- CAN/CSA-C22-2 No. 61010-1-12, 3rd Edition, Revision dated April 29, 2016,
- FCC 47 CFR Part 15B,
- ISED ICES-001, Issue 4: 2006, Updated November 2014,
- China EEP Hazardous Substances Information
<http://www.thermofisher.com/us/en/home/technical-resources/rohs-certificates.html>,
- ICH guidelines: Q1A for stability testing of new active ingredients and products, Q1B, for light stability testing.

Delivery of the Environmental Chamber

Packaging

The environmental chambers are delivered in a rugged packaging box. All packaging materials can be separated and are reusable:

Packaging materials

Packaging carton:	Recycled paper
Foam elements:	Styrofoam (CFC-free and HFC-free)
Pallet:	Chemically untreated wood
Packaging film:	Polyethylene
Packaging ribbons:	Polypropylene

Acceptance Inspection

After the environmental chamber has been delivered, check the delivery immediately for:

- Completeness
- Possible damage

If components are missing or damage is found on the environmental chamber or the packaging, in particular damage caused by humidity and/or water, please notify the carrier as well as Forma Technical Support immediately.

Risk of Injury



Should sharp edges have formed in damaged areas or elsewhere on the device, take all necessary precautions to protect personnel handling the environmental chamber. For example, have them wear protective gloves and other personal protection equipment.

Scope of Delivery

Part	Amount
Environmental chamber	1
Shelves and Shelf Channels	
3909	2 and 4
3942	3 and 6
Reflector tester for door switch	1
Set of accessories	1
- Water connection	
- Manual Watlow controller CD	
- Screws for wall mounting	

The desired light modules should be ordered separately:

50158127 Light module for ICH light stability testing.

50158128 Light module for plant growth.

50158129 Light module for animal hatching.

Transport Information



Humidity

After transport and decommissioning, or storage under humid conditions a drying-out process must be performed. During the drying-out process the equipment cannot be assumed to meet all the safety requirements of the IEC 61010-2-010 standard. The drying-out period is 2 hours.

Lifting Model 3909

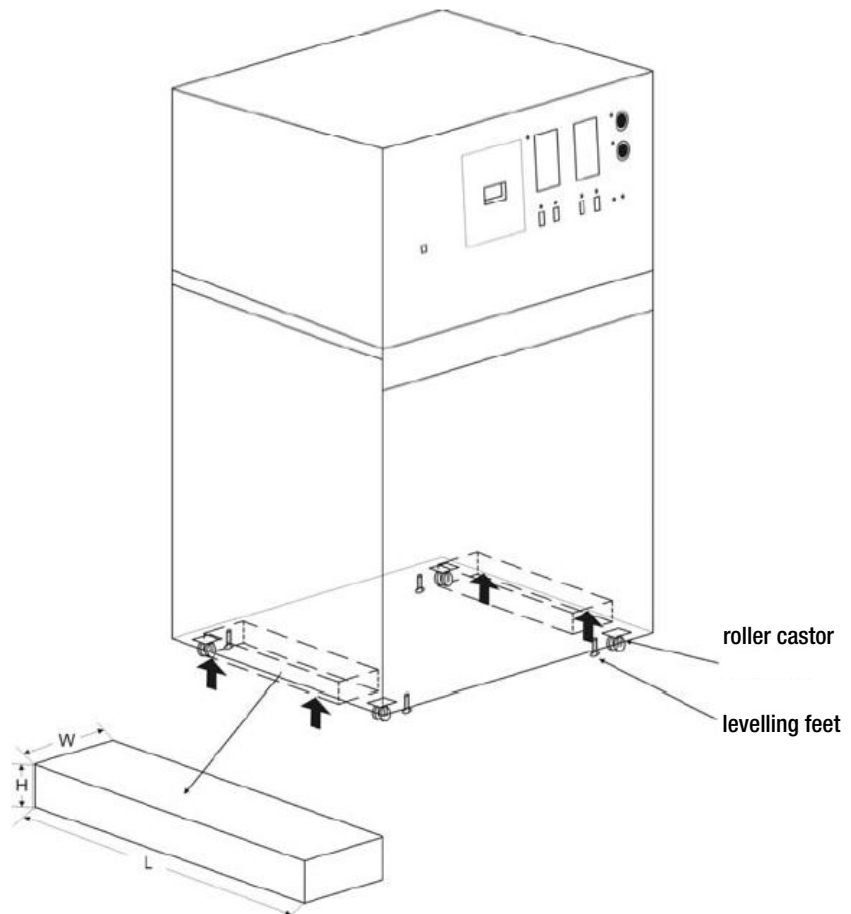


Figure 3-1 Lifting the model



The Model 3909 has a total weight of approx. 575 lbs / 261 kg.

Lift the unit only with appropriate lifting gear at the indicated lifting points.

Use 2 wooden blocks (WxLxH / 2 in x 20 in x 1.2 in / 50 mm x 500 mm x 30 mm) under the left and right side between the roller castors as a load spreading block, to avoid damaging the unit.

Levelling feet can be used to lock into position and/or levelling the unit.

Do not stack units!

Moving Model 3942



The Model 3942 has a total weight of approx. 765 lbs / 347 kg.

After unpacking and bringing in upright position, the unit is designed to be moved on even surfaces, in a laboratory, to its operating position, only.

Leveling feet can be used to lock into position and/or leveling the unit.

Installation

Ambient Conditions Requirements

The environmental chamber must only be operated in a location that meets all of the ambient condition requirements listed below:

- Installation location indoors in dry areas free from drafts.
- The dust pollution may not exceed the contamination category 2 based on EN 61010-1. Using the environmental chamber in an atmosphere with electrically conductive dust is prohibited.
- The room must be equipped with appropriate ventilation. Solid, level, fire-proof surface; no flammable materials opposite to the rear panel of the environmental chamber.
- The electrical circuitry of the environmental chamber has been designed for an operating height of up to 2000 m above sea level.
- If a high-voltage test is to be performed on the unit, it must first be heated for around 30 minutes at 50°C.
- The ambient temperature must be within 18°C - 26°C (64°F - 79°F) with light module and 16°C - 32°C (61°F - 90°F) without light module, see "Specifications".
- Devices that produce excessive amounts of heat must not be placed near the environmental chamber.
- Power line voltage variations must not exceed $\pm 10\%$ of the nominal voltage.
- Transient surges must lie within the range of levels that normally occur in the power supply system. The impulse withstand voltage based on surge category II of IEC 60364-4-443 shall be applied at the nominal voltage level.
- Relative humidity up to 70%, non condensing, at an ambient temperature of 28°C, decreasing linearly up to 55% at 32°C without light module, up to 70%, at 28°C with light module.
- Please note: Should condensation exist, wait until the moisture has evaporated completely before connecting the environmental chamber to a power source and powering up.



WARNING

Connect to suitable power supply only.

See chapter Technical Specifications for specific power input for the respective unit.

Intermediate Storage

When the chamber is placed in intermediate storage, which is permissible for a maximum of four weeks, make sure that the ambient temperature is between 20°C to 60°C (68°F to 140°F) and the maximum relative humidity does not exceed 90%, non-condensing.

Installing the Wall Anchors

The unit has two wall anchor studs located in the left and right side of the cabinet. Use the provided 5/16" bolts to secure the wall anchors to each side of the cabinet top. Anchors that connect between the cabinet sides to facility wall are customer supplied.



To prevent the unit from tilting, wall brackets must be obtained and installed by the customer to secure the unit before use.

NOTE

For Model 3942 - Wall anchors are required to meet the UL Tip Test Safety Standards. For Model 3909 - Wall anchors are not required to meet the UL Tip Test Safety Standards. However, they are included in the event that the cabinet is installed on a benchtop.

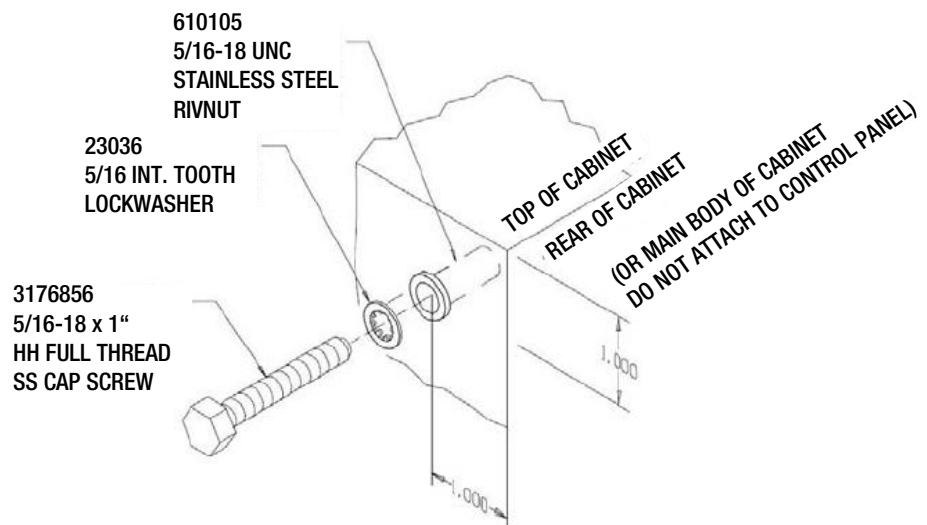


Figure 4-1 Wall Anchor Installation

Power Connection

See the serial tag on the side of the unit or the “Specifications” section for electrical specifications.



Connect the environmental chamber to a grounded, dedicated circuit. For Models 3909 and 3942, the power cord connector is the mains disconnect device. Position the chamber to allow unobstructed access so the unit can be easily disconnected in an emergency.

For Models 3909 and 3942, plug the provided 10 ft. power cord with the CEE 16 A, 6h plug into the grounded dedicated electrical circuit.

Installing the Shelves

The shelves may be installed at any level in the environmental chamber. Install a shelf channel on each side. With the tabs pointing up, attach the channel by locating the rivet into a slotted hole, far end first. Pull the channel toward the front and slide the front rivet on the channel into the slotted hole and press down. Make sure that the channels are opposite each other so that the installed shelf will be level.

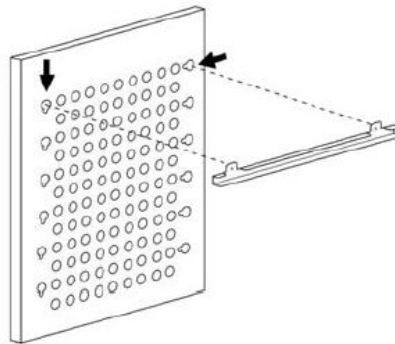


Figure 4-2 Install Shelf Channel

Leveling the Unit

Place a bubble-type level on a shelf inside the environmental chamber. Adjust the feet as needed; counterclockwise to lengthen or clockwise to shorten. Level the unit front-to-back and left-to-right.

Connect Water Inlet for Humidity System

The humidity reservoir will require approximately three cups (0.710 liter) of water on the initial filling. For best operation of the environmental chamber, sterilized distilled, demineralized or de-ionized water should be used in the humidity reservoir. Water purity should be in the resistance range of 50K to 1M Ω ·cm, or a conductivity range of 1.0 to 20.0 μ S/cm. Refer to ASTM Standard D5391-93 or D4195-88 for measuring water purity.

Distillation systems, as well as some types of reverse osmosis water purity systems, can produce water in the quality range specified. Tap water is not recommended as it may contain chlorine, which can deteriorate the stainless steel. Tap water may also have a high mineral content, which would produce a build-up of scale in the reservoir. High purity or ultrapure water is not recommended as it is an extremely aggressive solvent and will deteriorate the stainless steel. High purity water has a resistance of above 1M to 18M Ohm*cm. Even high purity water can contain bacteria and organic contaminants. Water should always be sterilized or treated with a decontaminant, safe for use with stainless steel as well as safe for the product, prior to being introduced into the humidity reservoir.

NOTE

Thermo Fisher Scientific offers free water sample testing. For further information contact our Customer Service Department.



Distilled or de-ionized water used in humidity reservoir must be within a water quality resistance range of 50K to 1M Ohm*cm to protect and prolong the life of the stainless steel. Use of water outside the specified range will decrease the operating life of the unit and may void warranty.

The water inlet is the 1/8" FPT connection located on the rear top center of the environmental chamber. For pressurized systems, water inlet pressure must not exceed 40 PSI. A manual shut-off valve should be installed between the main water supply and the environmental chamber. A water strainer is provided that can be connected to the back of the cabinet if desired.



To prevent mineral buildup on humidity generator walls, it may be necessary to clean the humidity generator with a non-metallic abrasive pad and flush thoroughly every two to three months. Refer to "Clean/Adjust Steam Generator" on page 13-4 .

Alternate Water Supply for Humidity System

If an in-house water supply of the required purity range (50K to 1M Ohm*cm) is not available, an alternate water supply method can be used. A large vented carboy (5 gal. minimum) of water in the required purity range can be placed on top of the unit. The provided 1/4" hose barb fitting should be used to connect to the 1/8" FPT water inlet fitting, located on the rear top center of the environmental chamber.

NOTE

To prevent accidental slip off of the connecting hose and flooding of the floor, use of carboy with barbed fitting only.

Attaching Drain Connections

The cabinet's 3/8" MPT drain connection is located on the rear (lower left side) of the cabinet (Figure 4-3). A P-trap is included with the unit and must be installed on the connection.

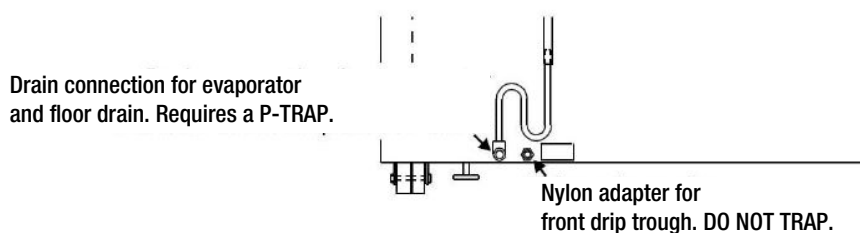


Figure 4-3 P-Trap Installation Location

To install the drain connection:

1. Using teflon pipe thread tape, tape the threads on the cabinet drain connection.
2. Using an open end adjustable wrench, install the P-trap onto the connection. Make sure the trap section is positioned down.
3. Push a piece of 3/8" ID tubing onto the trap and direct the tubing to a convenient drain. Install a hose clamp on the tubing, if desired. A condensate evaporator (P/N 1900031) or condensate pump (P/N 184062) may also be used.

To connect the nylon adapter from the front drip trough, do not install a p-trap on the nylon adapter (Figure 4-3). Push a piece of 3/8" ID tubing onto the nylon adapter and direct the tubing to a convenient drain. Install a hose clamp on the tubing, if desired.

Product Description

There are 2 types of environmental chambers:



Figure 5-1 Front view

Type	Dimension	Power supply	Refrigerant	Process
3909	311 Liter /11 cu.ft.	400 V - 50/60 Hz	R513a	with Temperature & Humidity Control
3942	821 Liter / 29 cu.ft.	400 V - 50/60 Hz	R513a	with Temperature & Humidity Control

Process Configuration

Parameter	Unit	3909	3942
Chamber temperature range without humidity control, with lighting application	Number of light modules	2	3
	Temperature range °C (°F)	10 - 50 (50 - 122)	20 - 50 (68 - 122)
	Number of light modules	-	2
	Temperature range °C (°F)	-	12 - 50 (54 - 122)
	Number of light modules	1	1
	Temperature range °C (°F)	5 - 50 (41 - 122)	8 - 50 (46 - 122)
Chamber temperature range with humidity control, with lighting application	Number of light modules	2	2
	Temperature range °C (°F)	15 - 50 (59 - 122)	15 - 50 (59 - 122)

Parameter	Unit	3909	3942
	Number of light modules	1	1
	Temperature range °C (°F)	10 - 50 (50 - 122)	10 - 50 (50 - 122)
Chamber range with lighting application	%rH	Above ambient to 75	Above ambient to 75

Light Protection included as Option in Door Switch

A “light protection” feature is included in the chamber. When this option is installed, the light will automatically switch off as soon as the door is opened. It protects the eyes of the operator when opening the door. Alternatively special protection goggles should be used in case this door switch is not installed.

For other applications, such as insect hatching, you can deactivate this feature.



Figure 5-2 Light Protection Switch



Figure 5-3 Reflector

In case the “light protection” feature is installed, the user can check the lamp function by a supplied additional reflector.



When opening the environmental chamber with light modules in operation do not look directly in the light, wear corresponding safety goggles.

NOTE

Watch samples only temporarily with the light on.

NOTE

Since the lights emit the complete spectrum of daylight, this is not a UV source (UV generator).

4-20 Milliamp Output

The environmental chamber is equipped with 4-20mA output for the remote transmission of temperature, humidity and CO₂ data. A terminal strip is located on the back of the environmental chamber for convenience. Refer to Figure 5-4 for terminal pin identification.

1	2	3	4	5	6	7	8	9	10
4-20 +	4-20 -	4-20 +	4-20 -	Common	N.O.	N.C.	4-20 +	4-20 -	
Temperature 4-20mA (-20 to 80°C)		Humidity 4-20mA (0 to 100%)		Remote Alarm 30V 1A max.		CO ₂ 4-20mA (0 to 20%)			

Figure 5-4 Terminal Pin Identification

Remote Alarm Contacts

Remote alarm connections are also included on the terminal strip providing Normally Open (N.O.) and Normally Closed (N.C.) contacts. C is the Common terminal. The remote alarm will activate when either the chamber's temperature, humidity, or CO₂ go out of the set alarm limits.

NOTE

When the chamber temperature control setpoint is changed, the undertemp safety thermostat must be reset to accommodate the change.

NOTE

The undertemp control is not directly calibrated. The numbers on the dial are for reference only.

Access Port

At the left side of the unit is one access port to feed-in cables to the inner chamber. To minimize the opening cone shaped inserts are available. If not in use, the inside and outside openings should be closed using the 2 plugs supplied with the unit.



Figure 5-5 Access Ports

NOTE

Check the access openings for condensation and wipe dry if necessary. At least every 3 months.

Solid Door

The solid door replaces the standard glass door. It has a heater built in to reduce condensation.



Figure 5-6 Solid door 3909



Figure 5-7 Solid Door 3942



Figure 5-8 Solid door drain

The drains for condensed water are in the solid door and the front frame.



Figure 5-9 Solid door drain

The condensed water is drained off to the rear side.



Door opening/closing

To avoid sample damage by vibration, do not roughly open or close the glass and solid door.

To avoid slipping due to a water puddle in front of the unit caused by condensed water dropped down on the door, do not roughly open or close the solid door.



If water leaks the unit, clean up the water immediately to avoid slipping.

Check for the cause of the leakage and eliminate before continuing operation.



Pinch of body parts

To avoid pinching of fingers or hand, e.g. on hinge side between door and top box, close the solid door only with the handle.

Light Modules

Depending on the application, there are 3 different light modules for the Environmental Chambers:

Stability Testing ICH-Q1B

ICH International Conference on Harmonisation of technical requirements for registration of pharmaceuticals for human use. Q1B photostability testing of new drug substances and products. Regulatory review quality, safety, efficacy and multidisciplinary guidelines.

Plant Growth

General plant growth, thale cress plant (*Arabidopsis thaliana*), algae, tissue culture, seed germination.

Hatching of Animals / Insects

Day-active animals, e.g. mice / fruit flies.



Risk of UV exposure

Use the light module only for its intended application. Don't use ICH modules for plant growth or animal hatching.



UV-A and blue light radiation

During inspection or replacement of samples, wear protective goggles with orange lenses.



Cooling of the environmental chamber must always be in operation, when using a light module.

If cooling is not in operation, the chamber temperature can rise to 95 °C, causing over-temperature protection.

NOTE

The light performance of the lamps has its optimum at a working temperature of 25°C. At higher or lower temperatures inside the chamber, the light current decreases.

Construction

The light modules are in principle consistently constructed

- 7 fluorescent lamps each
- Reflector
- Protective grid



Figure 5-10 Light modules

The Stability ICH light module has 2 different types of lamps, 5 x Osram Biolux and 2 x JUST daylight 6500. The 2 JUST lamps are mounted in the 2nd and 6th lamp position of the module. The position is marked with a cut-out.

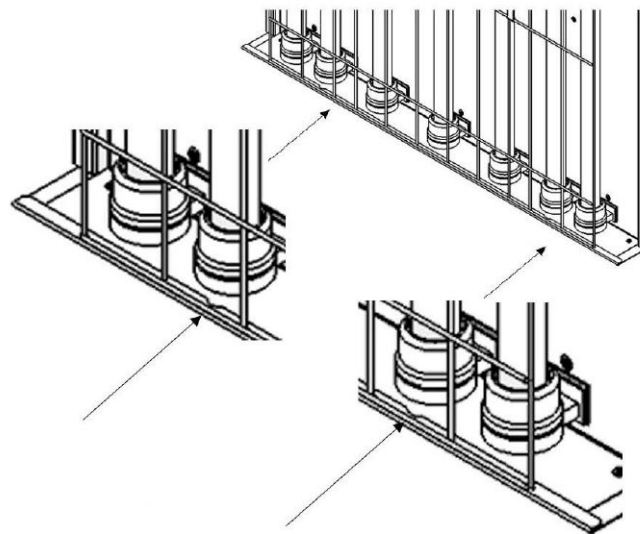


Figure 5-11 Light modules

The plant growth light module consists of 7 x Osram Fluora lamps.

The animal hatching light module consists of 7 x Osram Biolux lamps.

NOTE

The installed grid is to protect against tube breakage and thus to avoid injury and leakage of mercury.



Lamp breakage

If the environmental chamber is not used in the manner specified in this operating manual, the protection provided by the equipment design may be impaired.

In case of lamp breakage:



Persons who are not needed for disposal must leave the room.

Attention

Do not use a vacuum cleaner to remove the fragments and this will spread the mercury vapor and dust throughout the area and possibly contaminate the room.

1. Switch the device off.
2. Ventilate the room for at least 15 minutes, if possible with air passage.
3. If present, switch off central heating/air conditioning.
4. Wear cutting-resistant gloves so as not to cut on the pieces.
5. Sweep up all parts and remove small pieces with a moistened cloth. Lamp residues, as well as wipes, pack in a tear-proof plastic bag or tight container and seal well.
6. Dispose of the broken lamp parts at the nearest waste lamp collection point (www.lightcycle.de). If the lamp parts have to be stored temporarily, this should be done outdoors.

Additional Information: Lamp Breakage

In Germany

Guide: Federal Environment Agency:

<https://www.umweltbundesamt.de/publikationen> - Energy-saving lamps in the discussion.

Since 2006, fluorescent lamps may only be disposed of via the public and private waste management authorities of municipalities, cities and counties.

In North America

CA.GOV, 2008. Mercury Reference Exposure Levels. Retrieved Jan. 06, 2011, from

<https://oehha.ca.gov/air/cnr/notice-adoption-air-toxics-hot-spots-program-technical-support-document-derivation#page=214>

EPA, U.S. 2010. Cleaning Up a Broken CFL. Retrieved Jan. 06, 2011, from

<https://www.epa.gov/cfl>

CFL and UV-Radiation

EnergyStar.gov

<https://energystar.zendesk.com/hc/en-us/articles/211438728-Do-Compact-Fluorescent-Light-Bulbs-CFLs-produce-a-hazardous-amount-of-UV-light->

https://www.energystar.gov/ia/partners/promotions/change_light/downloads/-Fact_Sheet_Mercury.pdf

Food and Drug Administration

<https://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/ucm116400.htm>

Health Canada

<https://www.nrcan.gc.ca/sites/oe.nrcan.gc.ca/files/pdf/residential/personal/pdf/hc-cfl-executive-summary-2009-12-21-final-eng.pdf>

Installation

The light module consists of light module body with protective grid, 7 fluorescent lamps and 14 lamp nuts.

Insert the Light Module

General notes

Do not use the light module as a storage surface, such as a shelf.

The module must be protected against ingress of liquids.

Module / Module surfaces heat up, note influence on overlying samples.



Two persons must handle the light module.

Personal protective equipment must be worn.

The weight of one light module is 12.6 kg / 27.8 lbs.



Health hazard

Dropping down the light module can lead to injuries.

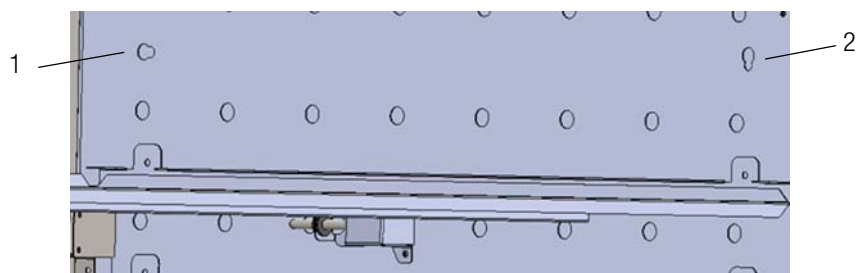


Contamination

Through installations and sensors (e.g. dosimeter) samples can be contaminated or damaged.

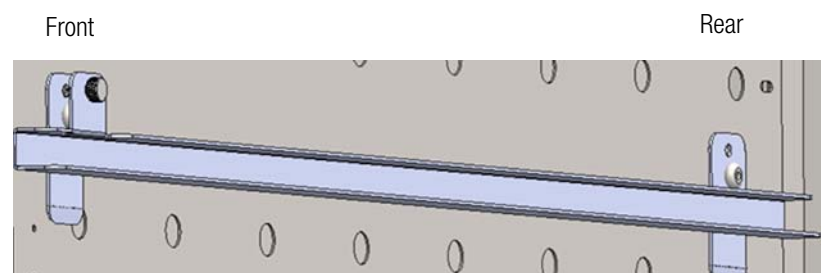
Attaching the Reinforced Support Channels

When using a light module, use the supplied reinforced shelf guides, one for the left and one for the right side..

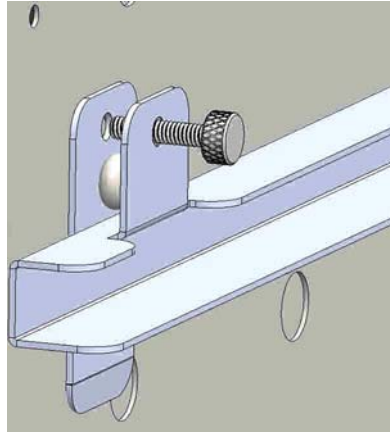


- Insert first rivet head at the rear side of the shelf channel in a keyhole similar shown in 1.
- Then insert the front rivet head in keyhole similar shown in 2.

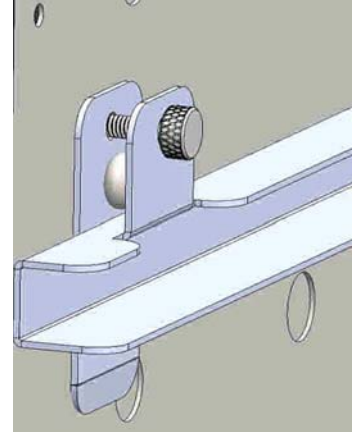
Fixing the reinforced shelf channels:



Shelf channel fixing open



Shelf channel fixing closed



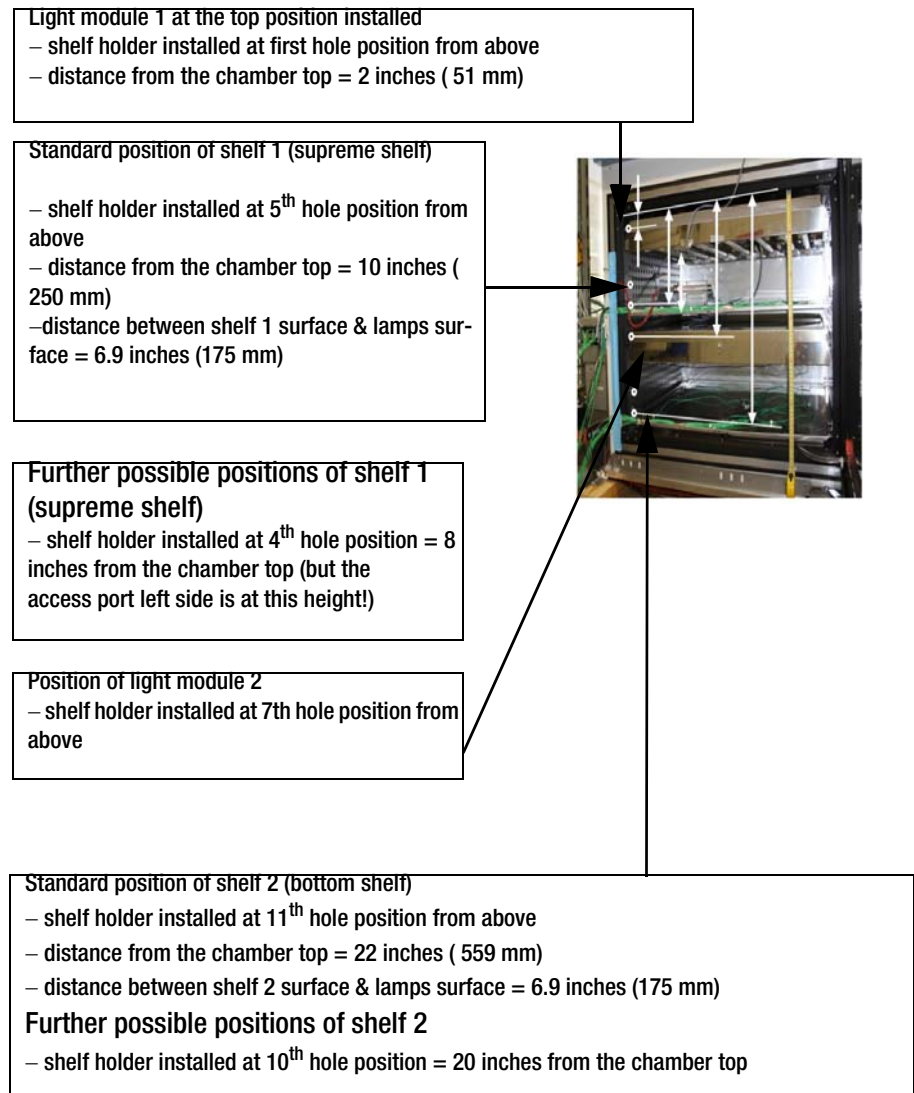
To lock the shelf channels screw in the fixing screw.

Possible Positions



One light module must be placed on top most position, otherwise the temperature performance is influenced.

3909 Light Module



3909 Sockets Light Module

The light module socket positions are at the right air duct wall in the chamber.

Socket position 1 (supreme socket)

- 3rd hole position of shelf holder from above
- distance from the chamber top = 6 inches (152 mm)
- socket position below of the light module 1



Socket position 2

- 6th hole position of shelf holder from above
- distance from the chamber top = 12 inches (305 mm)
- socket position above of the light module 2



Plug-in the mains supply and secure plug in the socket by turning clockwise.

NOTE

Sockets not in use must be covered with a locking cap to avoid moisture in the connector!

3909 Standard positions for max. 2 light modules with equal height distances.

3942 Standard positions for max. 3 light modules with equal height distances.



One light module must be placed on top most position, otherwise the temperature uniformity is influenced.

3942 Light Module

Light module 1 at the top position installed
 – shelf holder installed at first hole position from above
 – distance from the chamber top = 3 inches (76 mm)

Standard position of shelf 1 (supreme shelf)
 – shelf holder installed at 4th hole position from above
 – distance from the chamber top = 12 inches (300 mm)
 – distance between shelf 1 surface & lamps surface = 7.9 inches (202 mm)

Position of light module 2
 – shelf holder installed at 8th hole position from above
 – distance from the chamber top = 24 inches (609 mm)

Standard position of shelf 2
 – shelf holder installed at 11th hole position from above
 – distance from the chamber top = 33 inches (838 mm)
 – distance between shelf 2 surface & lamps surface = 7.9 inches (202 mm)

Position of light module 3 (at the bottom position installed)
 – shelf holder installed at 16th hole position from above
 – distance from the chamber top = 48 inches (1219 mm)

Standard position of shelf 3 (bottom shelf)
 – shelf holder installed at 19th hole position from above
 – distance from the chamber top = 57 inches (1447.8mm)
 – distance between shelf 3 surface & lamps surface = 7.9 inches (202 mm)

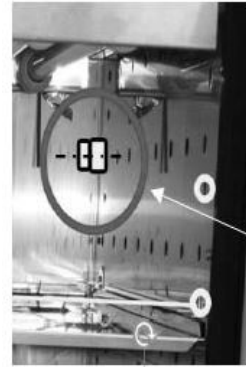


3942 Sockets for Light Module

The light module socket positions are at the right air duct wall in the chamber.

Socket position 1 (supreme socket)

- between second and third hole position of shelf holder from above
- distance from the chamber top = 7.5 inches (191 mm)
- socket position below of the light module 1



Socket position 2

- 7th hole position of shelf holder from above
- distance from the chamber top = 21 inches (533 mm)
- socket position above of the light module 2



Socket position 3

- 14th hole position of shelf holder from above
- distance from the chamber top = 42 inches (1067 mm)
- socket position above of the light module 3



NOTE

Sockets not in use must be covered with a locking cap to avoid moisture in the connector!



Possible risk to user and samples

Replace lamps only with corresponding ones in accordance with the intended use.

Lamp Exchange

If the useful life or the LLMF (Lamp Lumen Maintenance Factor) of a fluorescent lamp has been reached or if it is defective, all 7 fluorescent lamps must be replaced in order to correctly monitor the operating hours of the light module.

To replace the fluorescent lamps:

- Switch off the mains switch, disconnect the supply line of the environmental chamber space.
- Let the environmental chamber cool down.
- Open door.
- Remove the supply cable of the light module.
- Remove the light module from the environmental chamber and place it with the back on a level surface.
- Remove protective grid.
- Replace fluorescent lamps with new lamps of the same type:
- Loosen both lamp nuts.
- Remove the lamp.
- Remove the lamp nuts and install them on a new lamp.
- Insert new lamp and make sure it snaps correctly.

NOTE

The labeling of the lamps must always be directed towards the reflector and directed to rear side of the module.



NOTE

For ICH modules the correct position must be observed, Positions 2 and 6 are for JUST lamps.

- Turn on union nut (hand tight).
- Install protective grid.
- Insert the light module into the environmental chamber.
- Connect the supply cable of the light module, laying it in the corner, so that the air circulation is not affected.
- Close the door.
- Switch on power supply to live - switch on mains switch.
- Burning-in the light module for 100 h - create a program with the channels A, B and C ON and running time 100 h.

Technical Data

	Daylight 6500	OSRAM FLUORA	OSRAM BIOLUX
Electrical data			
Rated power	18 W	18 W	18 W
Power consumption	23 kWh/1000 h	23 kWh/1000 h	23 kWh/1000 h
Photometric data			
Light current at 25 °C	1250 lm	550 lm	1000 lm
Rated value LLMF at 2000 h	0.90	0.88	0.90
Rated value LLMF at 4000 h	0.86	0.83	0.86
Rated value LLMF at 6000 h	0.84	0.80	0.84
Rated value LLMF at 8000 h	0.81	0.77	0.81
Rated value LLMF at 12000 h	0.79	0.74	0.79
Rated value LLMF at 16000 h	0.78	0.72	0.78
Color rendering index Ra	≥ 95	≥ 95	≥ 95
Mercury content			
	4 mg	4.5 mg	4.5 mg

NOTE

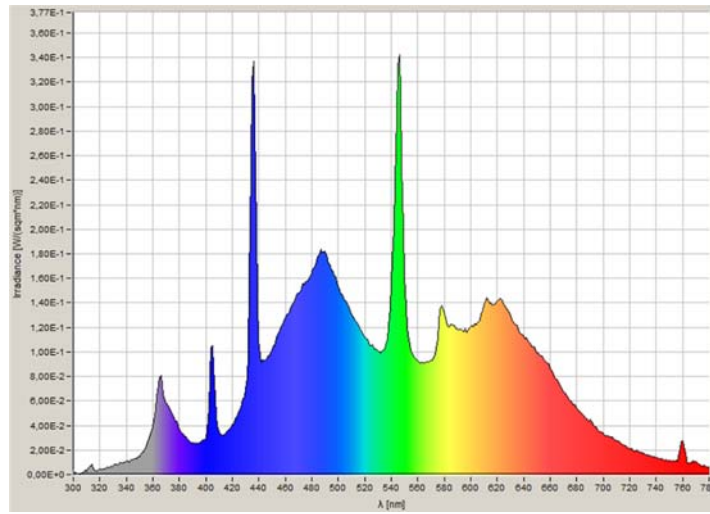
The light performance has its optimum at 25°C. At higher or lower temperatures, the light current decreases.

NOTE

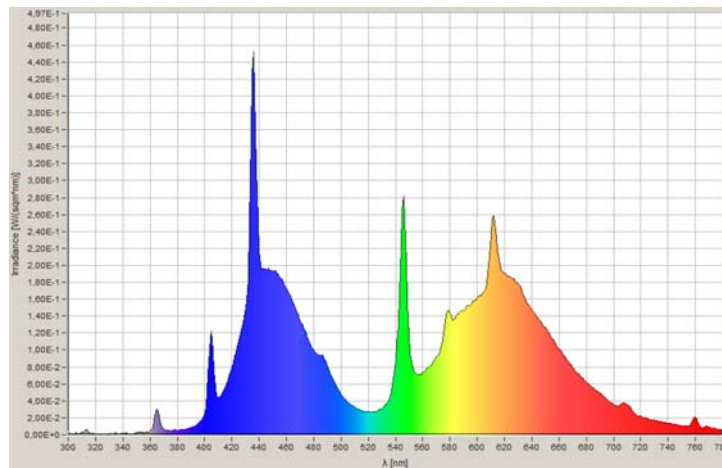
Daylight 6500 lamps are D65 lamps according to ISO 3668. Dose below the maximum of an 8-hour day.

Different fluorescent lamps have following light spectrums:

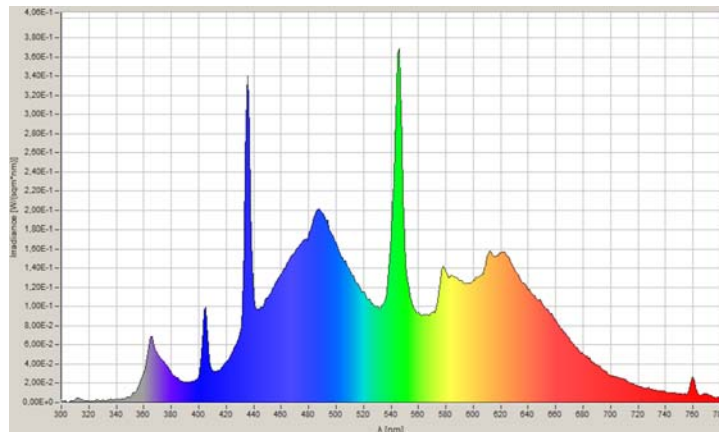
Stability Light color Daylight 6500 with increased UV content



Plants / Light color 77



Breeding animals / insects Light color 6500



Start-Up

When the humidification system is operational, the environmental chamber may be started. Preset the controls as follows:

Parameter	Unit
Overtemp Safety Thermostat	Fully Clockwise
Undertemp Safety Thermostat	Fully Counterclockwise
Main Power Switch	ON
Humidity Controller	Desired Setpoint
Temperature Controller	Desired Setpoint
Door Heater	40% (factory set)

NOTE

- When operating the environmental chamber with a light module, always switch on the cooling
- Observe temperature display on the device

Set the Overtemp Safety Thermostat

For best overall performance of the environmental chamber, the refrigeration switch should be turned On for most applications. When running Low or No humidity at high temperatures, the refrigeration switch may be turned Off.



The defrost switch must be set to “Auto” when the temperature setpoint is 10°C or below.

Allow the chamber temperature and humidity to stabilize, then set the overtemp safety thermostat as follows:

1. Turn the overtemp control knob slowly counterclockwise until the audible alarm sounds and the overtemp indicator lights.

- Turn the overtemp control knob clockwise at least 2°. The alarm should be silenced and the overtemp indicator light should go out. The overtemp safety thermostat is now set a few degrees above the control temperature setpoint. When the chamber temperature rises to the overtemp control point, the alarm system will activate, power to the heaters will shut off, and the chamber temperature will be maintained at the overtemp control point.

NOTE

When an overtemp condition occurs, the cause must be determined and corrected before normal operation under the main temperature controller can be resumed.

NOTE

When the chamber temperature control setpoint is changed, the overtemp safety thermostat must be reset to accommodate the change.

NOTE

The overtemp control is not directly calibrated. The numbers on the dial are for reference only.

NOTE**Operation of light module**

Before operating the environmental chamber with light modules burn-in the light module for 100 h by creating a program with the Operation Time Switch Light Modules, with the channels A, B and C ON and running time 100 h.

Set the Undertemp Safety Thermostat

Allow the chamber temperature and humidity to stabilize, then set the undertemp safety thermostat as follows:

- Turn the undertemp control knob slowly clockwise until the audible alarm sounds and the undertemp indicator lights.
- Turn the undertemp control knob counterclockwise at least 2° on the scale. The alarm will silence and the undertemp indicator light goes out.

The undertemp safety thermostat is now set a few degrees below the control temperature setpoint. When the chamber temperature drops to the undertemp control point, the alarm system activates, power to the compressor shuts off and the chamber temperature is maintained at the undertemp control point.

When an undertemp condition occurs, the cause must be determined and corrected before normal operation under the main temperature controller can be resumed.

Operation

Preparing the Environmental Chamber

The environmental chamber must not be released for operation before all major start-up activities have been completed (see “Installation” on page 4-1).

Device Check

Prior to starting operation, the following environmental chamber components must be checked for their correct function:

- The door seal in the front frame and solid door must not be damaged.
- The glass door must not be damaged.
- The shelving components must be installed safely.
- Unused sockets of the light modules must be covered with a plug.

Preliminary Cleaning and Disinfecting

Disinfect all interior surfaces with a general-use laboratory disinfectant, such as quaternary ammonium. Rinse thoroughly with sterile distilled water, then 70% alcohol. Dry with a clean cloth as needed.

Disinfect the shelf channels and shelves, then rinse with distilled water before installing.



Before using any cleaning or decontamination method except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

Handling and Control

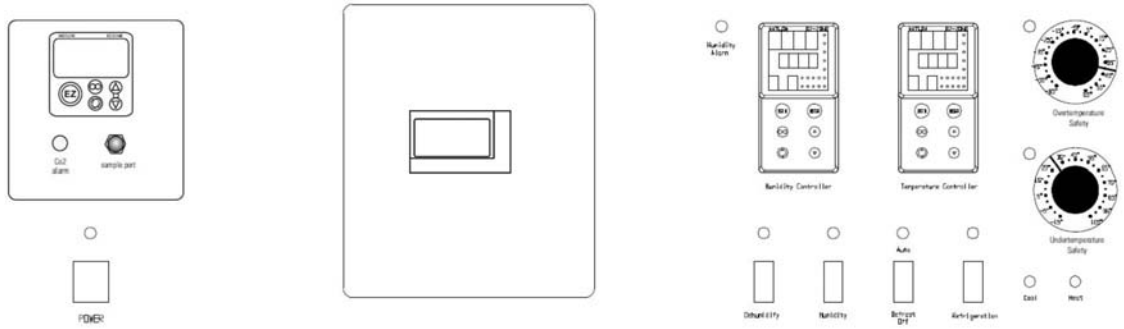


Figure 8-1 Control Panel

Control Panel

Main Power Switch and Indicator Light

The main power switch controls power to the environmental chamber. The main power indicator lights when the power switch is on and the unit is receiving power.

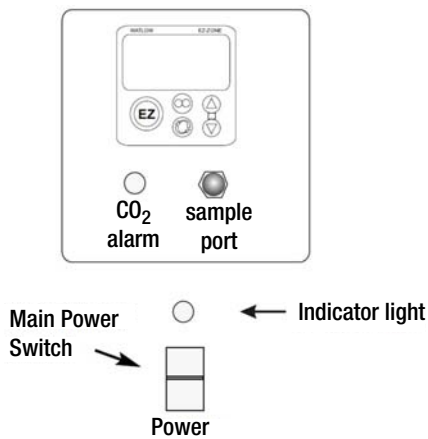


Figure 8-2 Main Power

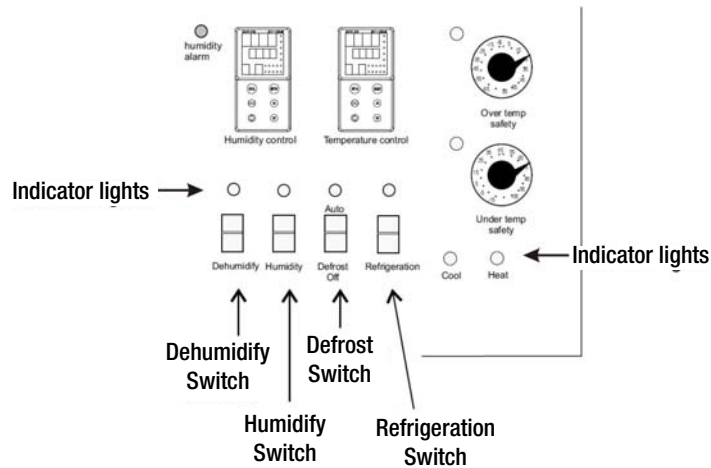


Figure 8-3 Switches

Switch and Indicator Light (Figure 8-3).

The refrigeration switch controls power to the refrigeration system. The refrigeration indicator lights when the refrigeration switch is on and the compressor is receiving power.

Defrost Switch and Indicator Light (Figure 8-3).

The defrost switch controls power to the defrost system. Setting the defrost switch to Auto will provide two 15-minute defrost cycles during a twenty-four hour period. The defrost indicator lights when the defrost switch is on and the environmental chamber is in a defrost cycle.



The defrost switch must be set to Auto when the temperature setpoint is 10°C, or below.

NOTE

When set temperature is above 10°C and the defrost switch is set to Auto, periodic temperature inconsistencies can occur.

Humidity Switch and Indicator (Figure 8-3)

The humidity switch controls the power to the humidification system circuit. The humidity indicator light will cycle as the controller toggles between humidify and dehumidify.

Dehumidify Switch and Indicator (Figure 8-3)

The dehumidify switch is used with the optional heatless dryer P/N 1900139 to provide dehumidification. The heatless dryer injects dry air into the environmental chamber as needed, to maintain humidity levels. When controlling humidity, the dehumidification switch should be in the ON position for most applications. The dehumidification light will cycle on and off as the humidity controller toggles between humidify and dehumidify.

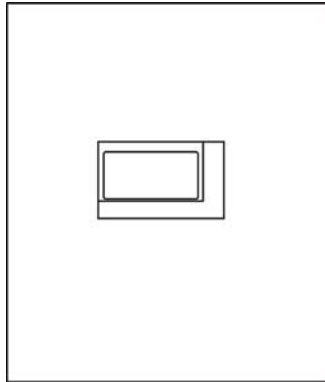


Figure 8-4 Time switch light modules

The time switch controls the LED light tubes of the light modules.

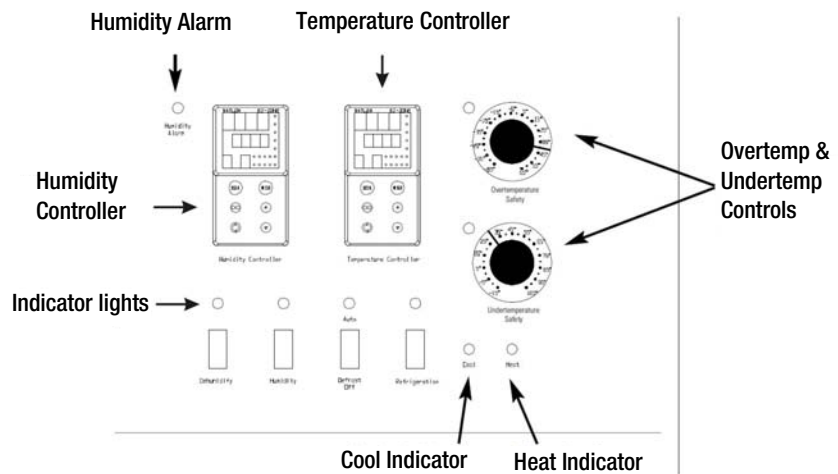


Figure 8-5 Indicator Lights and Controls

Heat Indicator (Figure 8-5)

The Heat Indicator illuminates when the heater activates.

Cool Indicator (Figure 8-5)

The Cool Indicator illuminates when the refrigeration system activates.

Overtemp Safety Control, Indicator Light & Audible Alarm (Figure 8-5)

The overtemp safety thermostat should be set slightly above the operating temperature of the environmental chamber. In the event of an overtemp condition, the overtemp safety thermostat:

- Activate the audible alarm and the overtemp indicator light.

- Interrupts power to the heaters and maintain the environmental chamber's cabinet temperature at the overtemp safety control point.

NOTE
The overtemp control is not directly calibrated. The numbers on the dial are for reference only.

NOTE
In case of overtemperature or power outage the lamps of the light module are also switched off and the plug controller symbol flashes in the controller.

If an overtemp condition occurs, the alarm can only be silenced by raising the overtemp safety thermostat setting. However, the cause of the problem must be determined and corrected before normal operation under the main temperature controller is resumed.

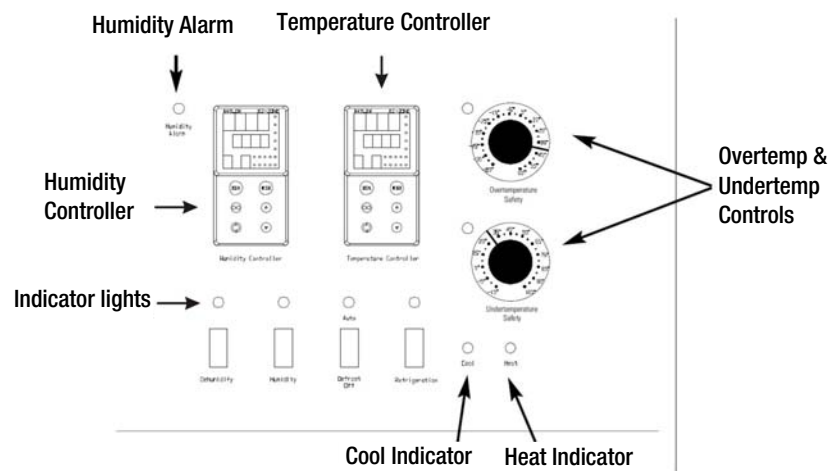


Figure 8-6 Indicators and Controls

Undertemp Safety Control, Indicator Light and Audible Alarm (Figure 8-6)

The undertemp safety thermostat should be set slightly lower than the operating temperature of the environmental chamber. In the event of an undertemp condition, the undertemp safety thermostat will:

- Activate the audible alarm and the overtemp indicator light.
- Interrupt power to the refrigeration system and maintain the environmental chamber's cabinet temperature at the undertemp safety control point.

NOTE
The undertemp control is not directly calibrated. The numbers on the dial are for reference only.

If an undertemp condition occurs, the alarm can only be silenced by lowering the undertemp safety thermostat setting. However, the cause of the problem must be determined and corrected before normal operation under the main temperature controller is resumed.

Audible Humidity Alarm and Indicator Display (Figure 8-6).

The humidity alarm is a function of the humidity controller (Figure 8-6). When the cabinet humidity goes outside the set parameters of the controller, the #4 indicator on the controller lights, the audible alarm sounds and the humidity alarm indicator on the control panel lights. The alarm can be silenced by pressing either EZ key.

NOTE

The humidity controller's high and low limits are factory-set at 100% and 0%. Therefore, the system will go into the alarm state when the humidity exceeds these percentages by one percent. When operating the environmental chamber near these high or low humidity levels, frequent alarms may occur. This will require that the controller's high or low limit be reset to three or four percent over the high limit or three or four percent under the low limit. Refer to the Watlow User's guide provided. Refer also to "Configuration Record" on page 13-8.

Set the Operating Temperature

The Watlow temperature controller's upper numerical display shows the actual temperature inside the environmental chamber. The lower display shows the temperature setpoint.

To change the setpoint, press the Up or Down Arrows. Temperature is set in one °C/°F increments.

Set the Operating Humidity

The Watlow humidity controller's upper numerical display shows the actual humidity inside the environmental chamber. The lower display shows the humidity setpoint.

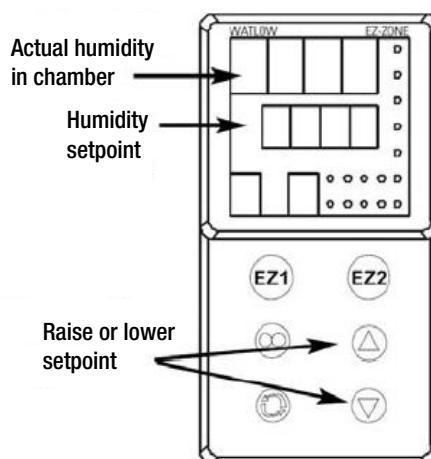


Figure 8-7 Changing Humidity

To change the setpoint, press the Up or Down Arrows. Humidity is set in one percent increments.

Air Exchange Ventilator Caps

Air exchange for the environmental chamber is regulated through the manually adjustable intake and exhaust ventilator caps located on the top of the cabinet. When viewed from the front of the environmental chamber, the intake cap is on the left and the exhaust cap is on the right. The ventilator caps may be opened by turning counterclockwise, and closed by turning clockwise.

For optimum performance of the unit, the vent caps should be closed at all times.

It might be advisable to open the ventilator caps for specific applications, e.g. for increased air exchange in insect hatching.

Set Up the Heatless Dryer (Optional)

The optional heatless dryer (P/N 1900139) provides dehumidification for the environmental chamber (oil removal filter must be installed and an air supply connected - Chapter 5). The dehumidify switch must be turned On for the dryer to operate. The dryer is controlled with the humidity controller and will purge dry air into the chamber as needed to maintain the control set point.

NOTE

Cabinets with factory installed heatless dryers are tested and calibrated at 30°C/30% RH. It is recommended that cabinets are recalibrated when set parameters are changed to another temperature and/or humidity set point.

Operation Time Switch Light Modules

The time switch controls the light tubes of the light modules. The time switch has 4 channels (3 are used) and can be weekly or yearly programmed.



Figure 8-8 Time switch

Symbol Legend



Channel is switched ON.



Channel is switched OFF.



For the current date the “holiday program” / “permanent by date” is activated.



Standard programming step.



Current state is based on a manual over-ride. The state will be canceled with the next programming step.



Days of the week Monday, Tuesday, ... Sunday; The underscores indicate if the program is active for the days above.



Current state is based on a switching time with pulse function.



Current state is based on a switching time with cycle function.



Weekday function: Switching time is entered by date but is shifted for future years in respect of the weekday (E.g. Tuesday this year... Tuesday next year).



Is displayed if the corresponding channel is activated by the external input.



Element within sub-menu "program delete".



Switching function / switching time with Easter function: The switching function takes into account the yearly shift of Easter holiday for future years and changes the date of the switching program accordingly.



1x-Function active: The switching time will be executed only once.



Days DCF: The time switch receives the signal for the DCF -77 time standard.



The time switch is locked; to unlock the device the PIN has to be entered.



Power outage or overtemperature indicator

Key Function



1. To access the Enter-mode (program, adjustments, options) from the automatic-mode.
2. To revert to the beginning of the current (sub-) menu.



1. To adjust the flashing digit.
2. To scroll through a choice.



1. Automatic-mode: To switch the channel ON or OFF until the next programming step occurs.
2. Automatic-mode: A push longer than 3 sec. = Permanent switching status (7).



1. To activate the time switch when operated without power supply.
2. To confirm the selection or the entered data.



Menu Overview

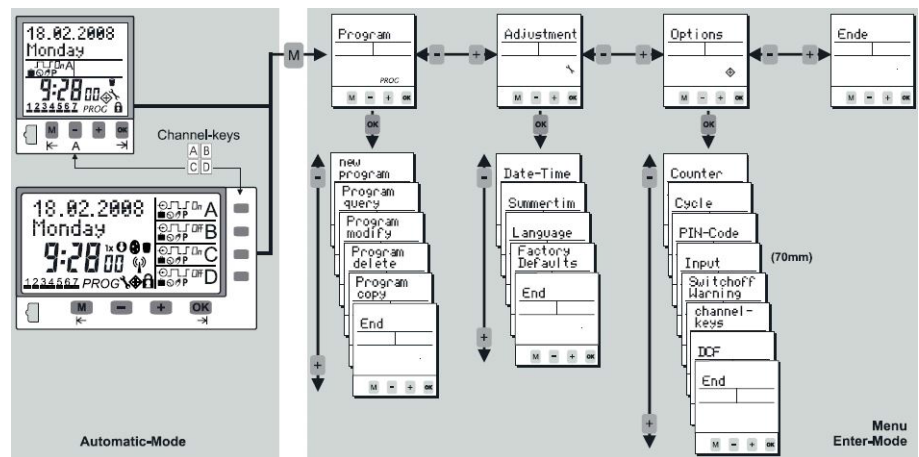


Figure 8-9 Menu overview

Handling Advice

- The time switch is programmable without external power supply after pressing the **OK** button.
- To revert one step or one level back, while in the Enter-Mode, press **M**.
- After completion of a (sub-) menu confirming end will return the device into the automatic-mode.
- With **- +** the choice changes from End to Continue. By confirming Continue the time switch returns to the beginning of the current (sub-) menu.
- When confirming End before completion, the time switch returns to the automatic-mode without saving the entered data.

Channel ON OFF / Permanent P

Channel ON OFF

By pushing **A/B** **C/D** buttons, a manual switch of the channels takes place. The resulting switching status is marked with the hand-symbol and remains until the next programming step occurs (temporary over-ride).

NOTE

For most basic application, to switch on / off the light, simply activate or deactivate channel A, B or C.

Permanent Switching Status P

By pressing the corresponding channel button **A/B** **C/D** for more than 3 sec. the channel is permanently switched ON or OFF. The status remains until the next manual switching occurs (> 3 sec.).

Programming Menu

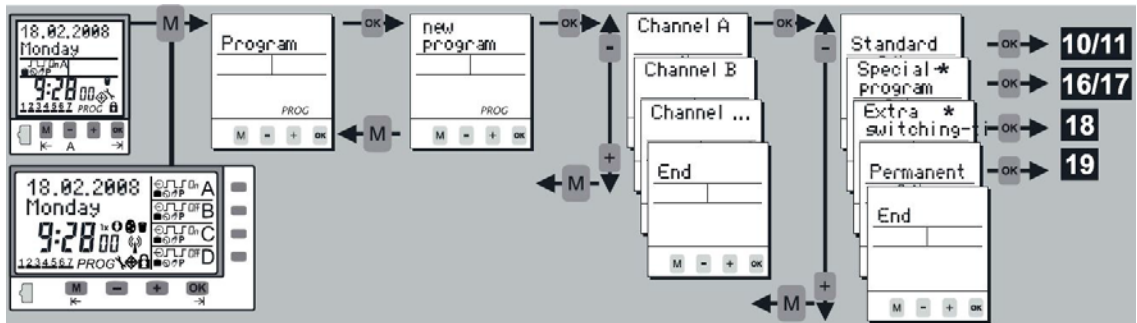


Figure 8-10 Programming menu

Standard Weekly Program

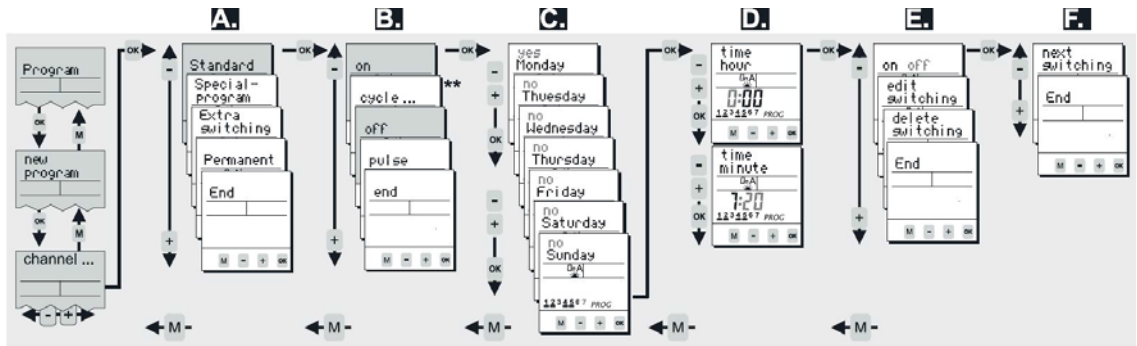


Figure 8-11 Standard weekly program

** The cycle function will only be available if it is activated (see “Special Program Activation by Date (within yearly time switches)” on page 8-13).

Example for the programming of STANDARD switching times (ON and OFF)

1. If you want to program a standard weekly switching time (on, off) confirm Standard with **OK**.
2. For regular switching times choose on or off with **-+** buttons and confirm with **OK**.
3. Within this level, you activate the days of the week (1...7) on which the switching time should happen. With **-+** you activate “yes” or deactivate “no” the corresponding date. Confirm each day with **OK**.
4. Adjustment of the time: Hours **-+** and **OK**. Minutes **-+** and **OK**.
5. Verify the entered switching time: If the flashing summary of the programming step is correct, verify on or off with **OK**. After verification you have the choice between edit/delete and end with **-+**.
6. If you want to proceed with programming, confirm next switching with **OK**. To leave the programming menu confirm end.

Information: You can easily transfer switching times from one channel to another if you use the copy function.

Cycle

Standard weekly program:

```
Program->new program->channel A/B/C/D->Standard->...
```

Special (weekly) program (to be activated by date for the yearly function):

```
Program->new program->channel A/B/C/D->Special-program->SP-entry->program-number->...
```

For the cycle function it is possible to enter a periodic switching time. The time switch acts as a recycling timer and switches between pulse (ON) and pause (OFF). The max. value for pulse and pause is 9:59:59 h:mm:ss.



If you haven't defined and activated a cycle, the cycle function will not be available as switching time. Therefore you have to activate and define at least one of the four cycles within menu options and sub-menu Cycle (see "Programming Menu" on page 8-10).



The cycle switching time will be terminated by another switching time (on, off, pulse) or by another cycle switching time.

Cycle Options

```
Options->Cycle->Cycle 1 - 4->...
```

You have the possibility to define 4 different cycles. For these purposes choose menu options and sub-menu cycle. The different cycles can be activated, defined or deactivated (the max. value for pulse or pause is 9:59:59 h:mm:ss):

- Choose menu options and sub-menu cycle and confirm with **OK**.
- Select with **- +**-buttons one out of the 4 cycles (cycle 1 – cycle 4) and confirm with **OK**.
- Activate the cycle by changing No to Yes with **- +**-buttons and subsequent confirming with **OK**.
- Define duration of the pulse „on-time“ (**- +** -> **OK**...).
- Define duration of the pause „off time“ (**- +** -> **OK**...).
- Confirm End with **OK**.

The cycle is now offered within the programming menu.



Further applications of the cycle function in combination with: External Input function and/or channel keys function.

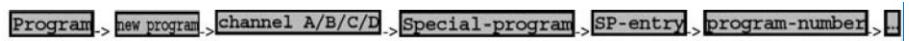


Pulse

Standard weekly program:



Special (weekly) program (to be activated by date for the yearly function):



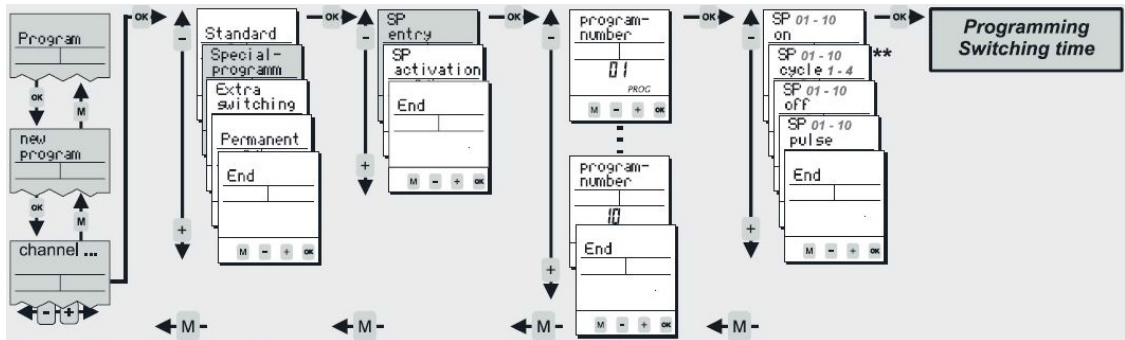
The pulse function provides you the opportunity of programming a switching time with a defined duration. As soon as the pulse-duration has expired, the time switch switches OFF automatically (the duration of the pulse is up to 59:59 mm:ss).

Priorities of the Switching Programs

Standard switching times, special programs, extra switching times and permanent by date are executed according to their corresponding priority (by channel and date).

All switching programs except extra switching times, suspend all other switching programs with lower priority:

Special Program Entry (within yearly time switches)



** The cycle function will only be offered if it is activated (see “Programming Menu” on page 8-10)

The yearly function of the switch is realized by special (weekly) programs which can be called up by date. Up to 10 special (weekly) programs can be entered (Program-Number 01 → Program-Number 10).

Execution of the Special program only after activation by date (SP activation see “Programming Menu” on page 8-10).

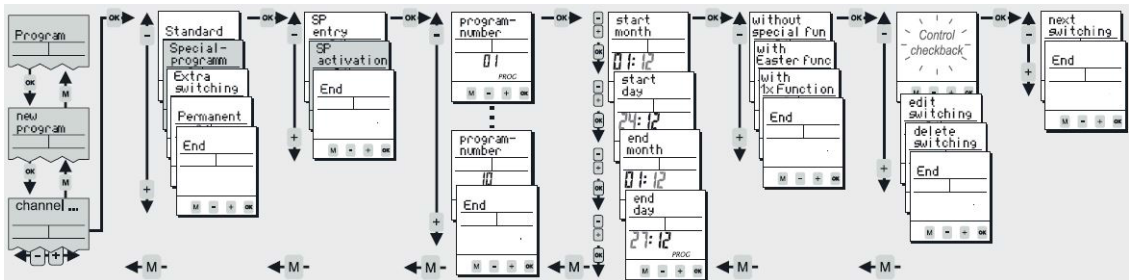


Some rules for the programming of Special programs

- Define the program number in which the new step will be an element before a new switching step is entered (Program-number 01 – Program-number 10)
- The number of switching times, which can be programmed in each special program, is only limited by the total number of free memory locations: SP on, SP off, SP cycle, SP pulse.
- The dates of the year, during which the special program should be applied, can be entered within the activation menu (within yearly time switches).
- Each special program can be activated as often as there are memory locations available (see “Special Program Activation by Date (within yearly time switches)” on page 8-13).
- During the activation dates of special programs, only switching steps of the special program with highest priority will be executed. Remaining special and standard programs are disabled.
- Please note the priorities of the different switching programs (see “Example for the programming of STANDARD switching times (ON and OFF)” on page 8-10).

Information: You can easily transfer switching times from one channel to the other if you use the copy function.

Special Program Activation by Date (within yearly time switches)



** The cycle function will only be offered if it is activated (see “Example for the programming of STANDARD switching times (ON and OFF)” on page 8-10)

A special program will only be executed if it is activated (and if it has the highest priority of all active switching programs (see “Example for the programming of STANDARD switching times (ON and OFF)” on page 8-10). Special programs can be activated as often as free memory locations are available. You can choose the special program (Program-Number), the dates for activation (Start date until end date) and additionally following options:

- Without special function: Special program will be applied each year, fixed to the entered dates.
- With Easter function: The time switch takes into account the yearly shift for Easter holiday for the following years and corrects the activation dates. (For programs relative to Easter, Pentecost Ascension).
- With 1x-Function: Special program will be applied only once.

Information: You can easily transfer switching times from one channel to the other if you use the copy function.

Extra Switching Time (within yearly time switches)

Program -> new program -> channel A/B/C/D -> Extra switching time -> []

These programming steps are single switching times by date. Extra switching times do not disable switching programs with lower priority.

Adjust the switching function (AT on, AT off, AT cycle, AT pulse) and the date on which the extra switching time will be executed. The following options are additionally available for the Extra switching time:

- Without special function: The switching time will be applied each year fixed to the entered date.
- With weekday function: The switching date takes into account the yearly shift of the weekday of the month. (e.g.: The switching date is always the second Saturday in February for the current and the following years).
- With 1x-Function: The switching time will be applied only once.

Permanent Program

Program -> new program -> channel A/B/C/D -> permanent -> []

The permanent by date program (Holiday program) is a permanently on or off status of the channel for the programmed dates. The number of switching times is only limited by the total number of free memory locations. Adjust channel, switching function and the duration by date. The following options are additionally available for the permanent by date program:

1. Without special function: The switching time will be applied each year fixed to the entered date.

2. With Easter function: The time switch takes into account the yearly shift for Easter holiday for following years and corrects the activation dates (For programs relative to Easter, Pentecost Carnival, Ascension).
3. With 1x-Function: The program will be applied only once.

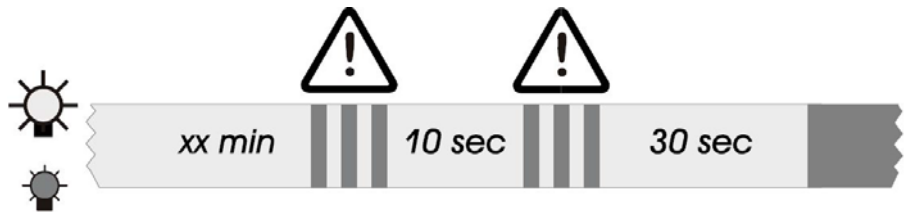
Switch off Warning

Options -> Switchoff warning -> []

Within menu Options and submenu Switch off warning, the early warning switch off function can be activated and deactivated:

- Warning No: The function remains inactive.
- Warning Yes: The function is activated and the switch off is signaled in advance (For illumination purposes, the warning is signaled by the flashing of the light according DIN 18015-2 = warning to avoid sudden darkness).



An activated warning affects all channels and all OFF switching times.



Channel Keys

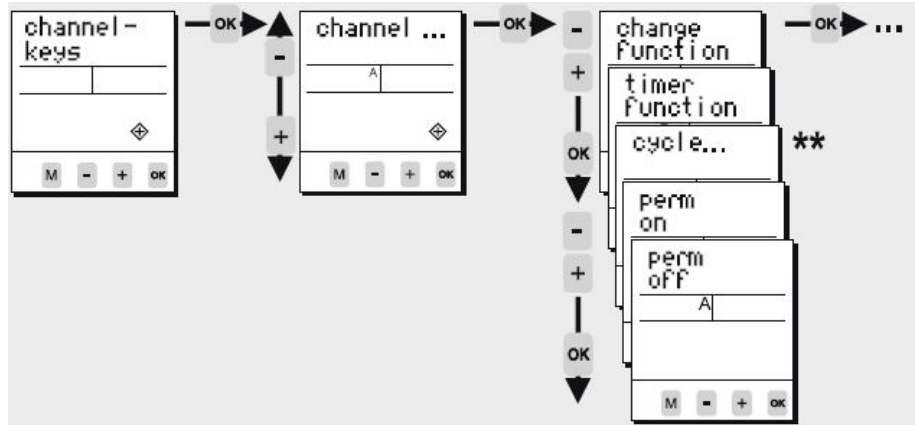
Options -> channel-keys -> []

Within the Options menu you will find submenu channel-keys. Here you have the opportunity to assign different response functions to the output channels.

These response functions will only be carried out when using the channel-keys   of the time switch (manual over-ride) or optionally when activating the channel with the external input. Thus, a programmed switching time will be executed as usual, independent of the settings within this channel-key-menu.

The correlation between the channel-keys and the channels is as follows:

- channel A => channel key A (push-button “A” of the device) / channel B => channel key B ...



** The cycle function will only be offered if it is activated (point 9)

Overview „channel-keys“ functions:

If you have assigned a specific response function to a channel, this switching function will occur if you push the channel-button on the front plate of the time switch (or if the external input for this channel is activated and a signal is applied to the input). For each channel, one out of the following functions can be defined:

- Change function (default setting): By pressing the channel key (or optionally using the external input) the switching status changes from ON to OFF or OFF to ON. This corresponds to a standard manual over-ride of the channel.
- Timer function: By pressing the channel key (or optionally using the external input) the timer starts and the corresponding channel switches ON. After the expiry of the timer-time the channel switches OFF. If the channel receives another signal before the expiry of time the time, switch reacts as follows:
 - After pressing the channel-button = Timer stops and the channel switches OFF.
 - Signal on the external input = Timer restarts/ Staircase lighting timer -> Resettable.
- Cycle 1 – 4: By pressing the channel key (or optionally using the external input) the cycle function starts.

Attention: This function is only available if the cycle is activated and defined in advance within menu Options and submenu Cycle.

- Perm on: By pressing the channel key (or optionally using the external input) the channel switches permanently ON. This status remains active until the channel key of the device is pressed again.
- Perm off: By pressing the channel key (or optionally using the external input) the channel switches permanently OFF. This status remains active until the channel key of the device is pressed again.



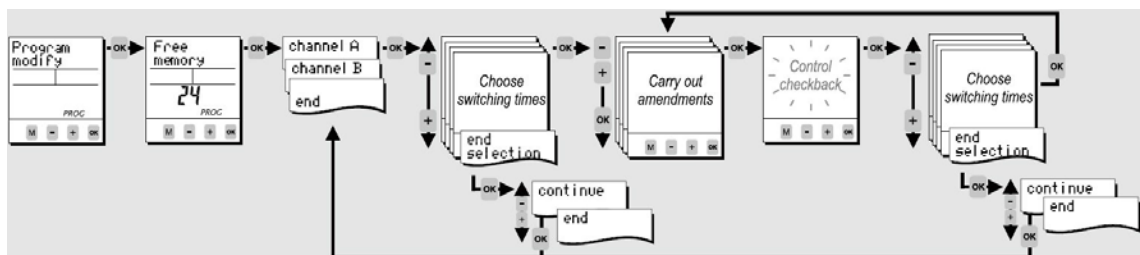
The Change function, Timer function and Cycle functions will be overridden by the regular switching program or by a manual over-ride!

Additional Adjustments

Menu	Main menu	Application
Program query	Program	To query the programming steps and remaining memory locations
Program copy	Program	Copy from one channel to another. Memory of the channel won't be overwritten; the copied switching steps appear additionally <div style="display: flex; align-items: center;"> Permanent by date function is not copied! </div>
Program delete	Program	Deletion of switching time(s). The program for all channels, single channels and single programming steps within one channel can be deleted.
Date-Time	Adjustment	Adjustment of date and time
Summertime	Adjustment	Adjustment of the daylight saving time mode (ON/OFF)
Language	Adjustment	Choice of languages
Factory Defaults	Adjustment	Reset to the state of delivery. <div style="display: flex; align-items: center;"> Date, time and switching program will be lost! </div>
Counter	Options	Displays the hour counter and pulse counter for each channel and the time switch itself.
PIN-Code	Options	The time switch can be locked with a 4-digit PIN-Code. The code can be adjusted, activated and deactivated. If you have forgotten the Code please call customer service.
Reset-Function	Press all front keys for 2 seconds. The time switch is reset. The values for date and time will be deleted and have to be re-entered. The switching program has not been deleted!	

Program Modify

Options

 ->
 Program modify ->
 ...


Within Program modify each single switching time can be modified.

Cleaning and Disinfection



If the unit has been in service, disconnect the power cord from both the unit and the power source. Allow the unit to cool before proceeding with any maintenance.



Before using any cleaning or decontamination method except those recommended by the manufacturer, users should check with the manufacturer that the proposed method would not damage equipment.



It is the responsibility of the user to immediately clean up after all accidental spills of hazardous materials. Be certain to follow local EHS policies (Environment, Health and Safety) with regards to personal protective equipment, cleaning, and disposal.

Cleaning

The chamber interior may be cleaned with a general-use laboratory disinfectant, such as quaternary ammonium, or alcohol.

The cabinet exterior may be cleaned with soap and water or any nonabrasive commercial glass cleaner. The glass door may be cleaned with commercial glass cleaner or with a solution of ammonia and water.



Alcohol, even a 70% solution, is volatile and flammable. Use it only in a well ventilated area that is free from open flame. If any component is cleaned with alcohol, do not expose the component to open flame or other possible hazards.



Do not use strong alkaline or caustic agents. Stainless steel is corrosion resistant, not corrosion proof. Do not use solutions of sodium hypochlorite (bleach) as they may cause pitting and rust.

Clean the Glass Doors

Some precautions in the cleaning and care of the environmental chamber glass doors: Moisture leaches alkaline materials (sodium, Na) from the surface of the glass. Evaporation of the moisture concentrates the alkaline and may produce a white staining or clouding of the glass surface. Cleaning chemicals with a pH above 9 accelerate the corrosion process. Therefore, it is very important to rinse and dry the glass doors after cleaning.



There is no simple method for repairing corroded glass. In most cases, the glass must be replaced.



Electrical shock

Contact with current-carrying components may cause a lethal electric shock.

Prior to cleaning and disinfection work, disconnect the device from the power supply!

- Turn the device off using the power switch.
- Unplug the power connector and protect it against accidental reconnection.
- Make sure the device is de-energized.



Health hazard

The surfaces of the workspace may be contaminated. Contact with contaminated cleaning liquids may cause infections. Disinfectants may contain harmful substances.

When cleaning and disinfecting, always observe the safety instructions and hygiene regulations!

- Wear safety gloves.
- Wear safety goggles.
- Wear mouth and respiratory system protection gear to protect your mucous membranes.

- Observe the safety instructions of the disinfectant's manufacturer and the hygiene supervisor.



Incompatible cleaners

Some device components are made of plastic. Solvents can dissolve plastics. Strong acids or caustic solutions can cause plastic to become brittle. For cleaning plastic components and surfaces, do not use solvents that contain hydrocarbons, solvents with an alcohol content of more than 10% or strong acids or caustic solutions!



Decontamination or cleaning agents

The "Forma" company or their agent is to be consulted if there is any doubt about the compatibility of decontamination or cleaning agents.

NOTE

Special cleaning instructions for the light module

When cleaning a light module, refer also to the section below with extended cleaning instructions.

Moisture-Sensitive Components

Sensitive components

Do not spray cleaning agent onto the controllers of the device. When wiping the device clean, always make sure that moisture does not enter into these components.

Cleaning Exterior Surfaces

1. Thoroughly remove dirt residues and deposits using a solution of tepid water and dishwashing agent.
2. Wipe the surfaces clean using a clean cloth and clear water.
3. Then, wipe the surfaces dry using a clean cloth.

Cleaning Operation Panels

The operation panels are moisture-sensitive.

Do not spray or wipe with cleaner.

Clean using a dry cloth of 100% micro fibre.

Wipe / Spray Disinfection

The manual wipe/spray disinfection is carried out in three stages:

- Predisinfection
- Cleaning
- Final disinfection



Alcoholic disinfectants

Disinfectants having an alcohol content of more than 10% may form, in combination with air, easily combustible and explosive gas mixtures.

When using such disinfectants, avoid open flames or exposure to excessive heat during the entire disinfection process!

- Use such disinfectants only in adequately ventilated rooms.
- After the disinfectant has been allowed to react, wipe the cleaned device components thoroughly dry.
- Observe safety regulations to avoid fire and explosion hazard caused by alcohol-containing disinfectants.



Chloride-containing disinfectants

Do not use chloride-containing disinfectants.

Predisinfection

Remove all samples from the work space and store them in a safe place.

Spray disinfectant onto the surfaces of the work space and of the accessories or wipe the surfaces clean using disinfectant.



Risk of injury by removing the glass panel

The glass panel may only be removed by properly trained and authorized personnel. The glass panel must be held by two persons.

Allow time for disinfectant to act as specified by the manufacturer.

NOTE

Disinfecting hard-to-reach components

Spray hard-to-reach components with disinfectant!

Cleaning the workspace

Thoroughly remove dirt residues and deposits using a solution of tepid water and dish washing agent.

Wipe the surfaces clean using a clean cloth and plenty of clear water.

Remove the cleaning liquid and wipe all surfaces of the workspace thoroughly dry.

Final Disinfection

Spray the surfaces of the workspace, the shelving system and the parts removed with disinfectant one more time and wipe dry.

Allow the disinfectant to act as specified by the manufacturer.

Reinstall the shelf system and the removed components.

Cleaning the Light Module Reflector

Visual check before every start of an application for dirt on the reflector.

If the reflector is dirty:

- Remove light module supply line.
- Remove the light module and place it “upside down” on a level.
- Remove protective grid and lamps.
- Clean reflector with a lint-free cloth and suitable cleaning agent and wipe dry.
- Insert lamps and protective grid.

- Replace light module and connect the supply line.

NOTE

Check the label of the lamps are always directed towards the reflector and directed to rear side of the module.



Do not use abrasive tools and cleaning agents!

Appropriate cleaning procedures to different degrees of pollution

Pollution degree	Recommended cleaning work	Not permitted type of cleaning
Loose dirt	<ul style="list-style-type: none"> > Clean soft duster or compressed air 	<ul style="list-style-type: none"> > Rub with pressure > No paper towels such as Towels for sanitary purposes
Light pollution	<ul style="list-style-type: none"> > Use citric acid-based detergent diluted with water (for example, 30 ml of lemon cleaner per 5 liters of water) > Follow the dilution recommendation of the detergent manufacturer so that the pH is between 3.0 and 4.5 > Use a fiber-free, clean cotton cloth > Use new clean towels 	<ul style="list-style-type: none"> > Do not use cleanser undiluted > Do not use vinegar-based cleaners > Neutral or alkaline cleaners are unsuitable > High force > Avoid direct finger touch with surface (fingerprint danger) > Do not reuse towels
Heavy pollution	<ul style="list-style-type: none"> > Fatty or oily impurities can be removed with a mixture of alcohol and water (1: 1), e.g. Methylated spirits, to be solved > Residues of alcohol-based cleaners can be easily removed with a water-soaked cotton cloth > Persistent dirt can be soaked in diluted lemon cleaner (see above) 	<ul style="list-style-type: none"> > Do not scratch or scrape with hard tools > No concentrated acids or alkalis, e.g. use hydrochloric acid > Do not use cleaning fluid > Do not use typical cleaning agents such as oven spray, window cleaner, parquet or furniture polish, drain cleaner, rim cleaner, lime remover etc. > Do not use ultrasonic cleaning

NOTE

Sockets not in use must be covered with a locking cap to avoid moisture in the connector!

Maintenance



De-energize all potential sources of energy to this unit and lockout/tagout their controls. (O.S.H.A. Regulation, Section 1910-147.)

The continued cleanliness of the stainless steel used in this unit has a direct effect on the appearance and operation of the unit. Use the mildest cleaning procedure that will do the job effectively. Clean the outside of the environmental chamber with soap and water or with any non-abrasive commercial spray cleaner. Clean the inside of the chamber with alcohol and/or soap and water. Disinfect the interior panels with a general use laboratory disinfectant, diluted according to the manufacturer's instructions. Rinse the surface thoroughly after each cleaning and wipe the surfaces dry. Always rub in the direction of the finish polish lines.



Do not use chlorinated solvents on stainless steel as they can cause rusting and pitting.



Do not use volatile or aromatic solvents for cleaning inside the cabinet as their residue can contaminate the cabinet environment.

The glass door may be cleaned with commercial glass cleaner or with a solution of ammonia and water.

Test the electrical safety according 61010 A2 once a year

NOTE

Visual check the function of the lamps before every application. For ICH application, use the tool for door opening.

Check regularly the light dose with a sufficient measuring process.

If the useful life or the LLMF (Lamp Lumen Maintenance Factor) of a fluorescent lamp has been reached or if it is defective, all 7 fluorescent lamps must be replaced in order to correctly monitor the operating hours of the light module.

Maintaining the Humidity Generator

Depending on the quality of water used in the humidification system, it may be necessary to clean the humidity generator every 2 to 3 months. Refer to Chapter 9 for cleaning instructions.

Preventive Maintenance for Environmental Chambers

Your equipment has been thoroughly tested and calibrated before shipment. Regular preventive maintenance is important to keep your unit functioning properly. The operator should perform routine cleaning and maintenance on a regular basis. For maximum performance and efficiency, it is recommended that the unit be checked and calibrated periodically by a qualified service technician. We have qualified service technicians, using NIST traceable instruments, available in many areas. For more information on Preventive Maintenance or Extended Warranties, contact Technical Services.

The following is a condensed list of preventive maintenance requirements. See the specified section of the instruction manual for further details. Cleaning and calibration adjustment intervals are dependent upon use, environmental conditions and accuracy required.

See Manual Section	Action	3 Months	Yearly	2 Years	5 Years	6 Years
--	Inspect door latch, hinges and door gasket seal.		✓			
8	Check air exchange ventilator caps for adjustment; open or close as required.		✓			
9	Perform a complete decontamination procedure. Wipe down interior, shelves, side panels with disinfectant. Rinse everything well with sterile water.		Between Experiments. More frequent decontamination may be required, depending on use and environmental conditions.			
13	Verify and document all calibrations, at minimum.		✓			
10	Inspect and clean the humidity generator, at minimum.*		Depending upon the quality of water used in the humidification system, it may be necessary to clean more frequently.			
5	Clean drip pan and drain lines.		✓			
9	Clean refrigeration system condenser.*		✓			
8	Verify defrost cycle for below 10°C operation.		✓			
--	Change filters (under normal conditions).		✓			
--	Replace filter elements on the dryer, if applicable. †		✓			
	Electrical safety test according to national law.		✓			
--	Rebuild solenoid valves on the dryer, if applicable. †			✓		
--	Replace/repack the desiccant towers on the dryer, if applicable.				✓	
--	Replace the check valve and o-rings on the dryer, if applicable.					✓
5	Check access ports for condensation, wipe dry, if applicable.	✓				
--	Check in regular intervals the light modules for defect lamps.	✓				
--	The customer should check the light quality of the light module with a suitable measuring system according to the standard EN 12464-1.	✓				

*Qualified service personnel only ~ Regular monitoring routines of the various levels in your unit is encouraged.

† Refer to Puregas Dryer manual included in shipping box.



Maintenance is to be performed by trained personnel only.

Returns for Repair

Prior to returning any materials, please contact our Customer Service Department for a "Return Materials Authorization" number (RMA).

Material returned without an RMA number will be refused.

Disposal



Warning Contamination Hazard

The environmental chamber may have been used for treating and processing infectious substances, which may have caused contamination of the environmental chamber and its components.

Prior to disposal, it is therefore mandatory that all refrigerated environmental chamber components be properly decontaminated.

Clean the environmental chamber components thoroughly, then disinfect or decontaminate them (depending on application).

Fill in and attach a declaration of decontamination with details on decontamination activities performed to the items that are to be disposed of.

NOTE Disposal Light Module

Fluorescent lamps may only be disposed of via the public and private waste management authorities of municipalities, cities and counties, e.g.:

WEEE - EC

EPA - the United States Environmental Protection Agency

Specifications

Parameter	Unit	Models	
		3909	3942
Chamber volume	L / cu ft	311 / 11	821 / 29
Chamber temperature range	°C (°F)	0 - 60 (32 - 140)	
Chamber humidity range	% RH	above ambient to 95	
Chamber temperature range without humidity control with lighting application	Max. number of light modules	2	3
	(°C (°F))	10 - 50 (50 - 122)	20 - 50 (68 - 122)
Chamber temperature range with humidity control with lighting application	number of light modules	-	2
	°C (°F)	-	12 - 50 (54 - 122)
	number of light modules	1	1
	°C (°F)	5 - 50 (41 - 122)	8 - 50 (46 - 122)
	number of light modules	2	2
	°C (°F)	15 - 50 (59 - 122)	15 - 50 (59 - 122)
Chamber humidity range with lighting application	number of light modules	1	1
	°C (°F)	10 - 50 (50 - 122)	10 - 50 (50 - 122)
Chamber humidity range with lighting application	% RH	above ambient to 75	

Unit dimensions	Unit	Models	
		3909	3942
Internal dimensions W x H x D	mm/in	787 x 609 x 686 / 31.00 x 24.00 x 27.00	787 x 1524 x 686 / 31.00 x 60.00 x 27.00
External dimensions (without feet / casters) W x H x D*	mm/in	965 x 1308 x 813 / 38.00 x 51.50 x 32.00	965 x 2248 x 813 / 38.00 x 88.50 x 32.00
Footprint	m ² / ft ²	0,785 / 8.45	
Number of Shelves: standard / maximum		3 / 9	6 / 16
Number of shelf positions		9	16
Shelf material		Solid stainless steel reinforced	
Shelf size (W x D)	mm/in	778 x 656 / 30.62 x 25.81	
Shelf surface area	m ² / ft ²	0,5 / 5.4	

		Models	
Unit dimensions	Unit	3909	3942
Loading capacity per shelf, slide in / out	kg/lbs	15,9 / 35	
Loading capacity per shelf, stationary		22.7 / 50	
Loading capacity of unit	kg/lbs	68 / 150	136 / 300
Weight of unit without accessories	kg/lbs	261 / 575	347 / 765
Weight of unit without accessories incl packaging	kg/lbs	325 / 715	472 / 1040
Weight per complete lighting module	kg/lbs	12.6 / 27.78	
External dimension incl packaging W x D x H	mm/in	-	1150 x 1245 x 2620/ 45 x 49 x 103
Access ports with stopper	1x access port at the left side 2x stopper each at inside & outside		
Access port diameter	mm/in	54 / 2.13	

		Models	
Temperature Performance without Humidity Control (at ambient temperature 22°C +/-3°C)	Unit	3909	3942
Temperature stability, temporal mid of work space according to DIN12880 at 20°C to 37°C (68°F to 99°F)	°C	≤ ± 0.1	≤ ± 0.1
Temperature uniformity between 25°C to 37°C (77°F to 104°F), spatial according to DIN12880 at typical value / max. value	°C	≤ ±0.3 / ± 0.4	

		Models	
Temperature Performance without Humidity Control with lighting application (at ambient temperature 22°C +/-3°C)	Unit	3909	3942
	number of light modules	2	2
Temperature stability, temporal mid of work space similar to DIN12880 at 20°C to 37°C (68°F, 99°F)	°C	≤ ± 0.3	≤ ± 0.3
Temperature uniformity between 25°C to 40°C (77°F to 104°F), spatial similar to DIN12880 at typical value / max. value	°C	12°C (54°F) 30°C (86°F) 50°C (122°F) ≤ ±1.5 / ± 1.7 ≤ ± 2.1 / 2.3 ≤ 1.9 / 2.2	≤ ±2.3 / ± 2.5 ≤ ±2.3 / ± 2.5 ≤ ± 2.0 / 2.3

		Models	
Temperature Performance with Humidity Control (at ambient temperature 22°C +/-3°C)	Unit	3909	3942
Temperature & humidity stability, temporal mid of work space according to DIN12880 at 20 °C to 37 °C (68 °F, 99 °F)	°C (°F) / % RH	≤ ± 0.1 ≤ ± 5	≤ ± 0.1 ≤ ± 5
Temperature uniformity between 25°C to 37°C, spatial according to DIN12880 at typical value / max. value	°C	≤ ±0.3 / ± 0.4	≤ ±0.3 / ± 0.4
Calibrated Climate Conditions / Temperature Conditions (measuring point is chamber center)	°C (°F) / % RH		40 (104) / 75

		Models	
Water performance data for humidity system	Unit	3909	3942
Water supply		Carboy or water system	
Water specification	min	Demineralized Water Resistance = 0.5 - 1 MΩ cm	
Input Water pressure		gravity to 40 psi (2.76 bar)	

		Models	
Temperatur Performance with Humidity Control with lighting application (at ambient temperature 22°C +/-3C)	Unit	3909	3942
	number of modules	2	2
Temperature & humidity stability, temporal mid of work space similar to DIN12880, at 30°C (86°F) / 75% RH	°C % RH	30°C (86°F) / 75% RH ≤ ± 0.2 ≤ ± 3	≤ ± 0.3 ≤ ± 3
Temperature uniformity between 25°C to 40°C (77°F to 104°F), spatial similar to DIN12880 at typical value / max. value	°C	≤ (±2.1 / 2.5)	≤ (±2.6 / ± 3,0)

		Models	
Lighting performance data per light module, according to ICH guideline Q1B option 2 (Temperature performance without humidity control)	Unit	3909	3942
Fluorescent lamp type		5x Osram Biolux L 18 W/965 2x JUST daylight 6500 proIndustry, 18W (B-J-B-B-B-J-B)	5x Osram Biolux L 18 W/965 2x JUST daylight 6500 proIndustry, 18W (B-J-B-B-B-J-B)
Number of fluorescent lamps & power input per lamp		7 x 18 W	7 x 18 W
Max. number of light modules per device model		2	3
Distance between lighting module & measuring point	mm/in	140 / 5.5	165 / 6.5
Evaluation surfaces on the shelf (width x depth)	m ²		259 x 218 432 x 364 610 x 510
Average Illumination on the shelf at 25°C	Lux		9500
Average UVA-intensity on the shelf at 25°C	W/ m ²		2.2
Illumination distribution relating evaluation surfaces	%		≤ ± 5 (259 x 218) ≤ ± 12 (432 x 364) ≤ ± 26 (610 x 510)

Models			
Lighting performance data per light module, according to ICH guideline Q1B option 2 (Temperature performance without humidity control)	Unit	3909	3942
UVA-distribution relating evaluation surfaces	%		$\leq \pm 5$ (259 x 218) $\leq \pm 14$ (432 x 364) $\leq \pm 26$ (610 x 510)
Max. needed photostability test time per module	hours		≤ 170

Models			
Lighting performance data per light module for Plant Growth applications (Temperature performance with humidity control)	Unit	3909	3942
Fluorescent lamp type		7x Osram Fluora L 18 W 77	7x Osram Fluora L 18 W 77
Number of fluorescent lamps & power input per module		7 x 18 W	7 x 18 W
Max. number of light modules per device model		2	1
Distance between lighting module & measuring point	mm/in	140/5.5	165/6.5
Evaluation surfaces on the shelf (width x depth)	m ²		259 x 218 432 x 364 610 x 510
Average Illumination on the shelf at 25°C	Lux		8000
Illumination distribution relating evaluation surfaces C	%		$\leq \pm 5$ (259 x 218) $\leq \pm 12$ (432 x 364) $\leq \pm 26$ (610 x 510)
Irradiance between wave length of 400 to 700nm (per light module)	$\mu\text{mol} / (\text{s} \cdot \text{m}^2)$		158

Models			
Lighting performance data per light module for animal hatching applications (Temperature performance with humidity control)	Unit	3909	3942
Fluorescent lamp type		7x Osram Biolux L 18 W/965	7x Osram Biolux L 18 W/965
Number of fluorescent lamps & power input per lamp		7 x 18 W	7 x 18 W
Max. number of light modules per device model		2	1
Distance between lighting module & measuring point	mm/in	140/5.5	165/6.5

Models			
Lighting performance data per light module for animal hatching applications (Temperature performance with humidity control)	Unit	Models	
		3909	3942
Evaluation surfaces on the shelf (width x depth)	m ²		259 x 218
			432 x 364
			610 x 510
Average Illumination on the shelf at 25°C	Lux	10000	
Illumination distribution relating evaluation surfaces	%		≤ ± 5 (259 x 218)
			≤ ± 12 (432 x 364)
			≤ ± 26 (610 x 510)

Models				
Electrical Data	Unit		3909	3942
Power line voltage (+/-10%)	V		208-220	208-220
Power line frequency	Hz		60	60
Power rating with all options Measured at ambient temperature of 26°C /79°F	W		3300	3300
Max current consumption with all options Measured at ambient temperature of 26°C /79°F	A		15.0	15.0
Power Cord / Plug			NEMA 14-20P	NEMA 14-20P
Energy consumption (without humidity control & without lighting modules) Measured at ambient temperature of 22°C / 72°F typical value / max. value	kWh per day	0°C (32°F)	ca. 16	ca. 18
		37°C (99°F)	ca. 15	ca. 16
		60°C (140°F)	ca. 19	ca. 21
Energy consumption (with humidity control & without lighting modules) Measured at ambient temperature of 22°C / 72°F typical value / max. value	kWh per day	5°C (41°F) / 80% RH	ca. 23	ca. 24
		30°C (86°F) / 75% RH	ca. 30	ca. 32
		60°C (140°F) / 75%	ca. 23	ca. 24
Earthing system (e.g. 1/N/PE)			1/N/PE	1/N/PE
IP protection system			IP 20	
Protection class			I (PE- connected)s	
Overvoltage category according to IEC 60364-4-443 ¹			II	
Contamination category ²			2	

Ambient conditions	Unit	Models	
		3909	3942
Ambient Temperature Range	°C (°F)	16 - 32 (61 - 90)	
Ambient Temperature Range with lighting application	°C (°F)	18 - 26 (64 - 79)	
Max. rel. humidity in service at or below 32°C, non condensing	% r.F.	55	
Max. rel. humidity in service at or below 28°C, non condensing with lighting application	% r.F.	70	
Storage temperature range	°C (°F)	20 - 60 (68 - 140)	
Max. humidity in storage, non condensing	% r.F.	90	
Post-transport acclimation time	h	2	
Noise level (measuring point: device-distance of the front side 1,0m, height=1,6m)	dB(A)	≤ 48	-
Heat load to the environment	W / BTU hour	1750 / 6000	1750 / 6000

Site conditions	Unit	Models	
		3909	3942
Maximum altitude above sea level	m/y NN	2000/2187	
Minimum side clearance	mm/in	150 / 5.9	150 / 5.9
Minimum front clearance	mm/in	1100 / 43.3	1100 / 43.3
Minimum back wall clearance	mm/in	250 / 9.8	250 / 9.8
Minimum top clearance	mm/in	250 / 9.8	250 / 9.8

Continuing research and improvements may result in specification changes at any time. Performance plus or minus the least significant digit unless otherwise specified.

¹ Installation category (overvoltage category) defines the level of transient overvoltage which the instrument is designed to withstand safely. It depends on the nature of the electricity supply and its overvoltage protection means. For example, in CAT II which is the category used for instruments in installations supplied from a supply comparable to public mains such as hospital and research laboratories and most industrial laboratories, expected transient overvoltage is 2500V for a 230V supply.

² Pollution degree describes the amount of conductive pollution present in operating environment. Pollution degree 2 assumes that normally only non-conductive pollution such as dust occurs with the exception of occasional conductivity caused by condensation.

Service



Service must be performed by qualified service personnel only!



De-energize all potential sources of energy to this unit and lockout/tagout their controls.

Remove Software Lockout

1. Press the Advance and Infinity keys at the same time and hold them for about six seconds. The word “Fcty” (factory) will appear in the bottom display. If numbers in the bottom display begin to scroll up or down, the keys have not been pressed simultaneously. Try again.

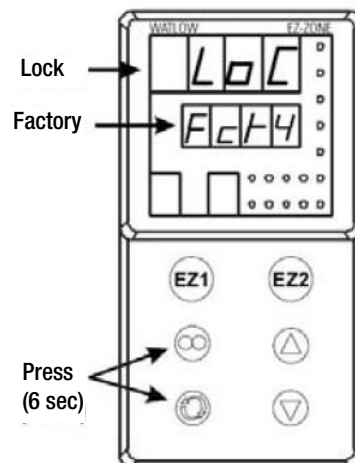


Figure 13-1 Displays

2. Press the Up Arrow until “LoC” (lock) appears in the upper display. The word “Fcty” will remain in the lower display (Figure 13-1).
3. Press the Advance key to scroll through the menus as follows:

Lower display	Upper display	Keystrokes
LoC.o	1	Change to 3 = unlocked
LoC.P	1	No changes required
PAS.E	1	No changes required
rLoC	1	Change to 5 = unlocked
SLoC	1	Change to 5 = unlocked

To turn the software lockout back On:

1. Set lock values back to previous setting. See “Remove Software Lockout” above.

Controller Configuration

The Watlow PM Temperature and Humidity Controllers have been configured at the factory. Copies of the Watlow Configuration records are included at the end of this section.



Do not re-configure the controller without first consulting the Technical Services department.

Offset Calibration (Temp/Humidity)

NOTE

Recalibration of setpoint is recommended when different climate classes are used for the applications with and without light function.

It may be necessary to calibrate the temperature or humidity controllers to match an independent temperature or humidity sensor. To do so, follow the next few steps.

1. Perform the “Remove Software Lockout’ procedure in this section.
2. Suspend an independent, calibrated sensor(s) in the center of the interior chamber.
3. Allow approximately 30 minutes for the environmental chamber to stabilize.
4. Press Up and Down Arrow keys simultaneously for 3 seconds. The word “OPER” appears in the lower display.
5. Press Down Arrow until “Ai” appears in the upper display.
6. Press the Advance key until “i.CA” appears in the lower display. Press Up or Down Arrow key to either add or subtract an offset value. This value is the difference between the actual value shown on the controller, and the reference sensor value.
7. Press the Infinity key until the display reverts to normal operation.
8. Perform the ‘Restore Software Lockout’ procedure in this section.

Set Door Heater Control



High voltage is present behind control panel. Servicing must be performed only by qualified electrical service personnel.

The infinite heater control is located in the left side of the environmental chamber top compartment behind the control panel door. The control varies the amount of door heat from no heat (zero) to full heat (100) as indicated by the dial face. If the knob is turned past zero, a “click” indicates that all power to the door is shut off. If turned past 100, a similar “click” indicates that the heat is set at maximum.

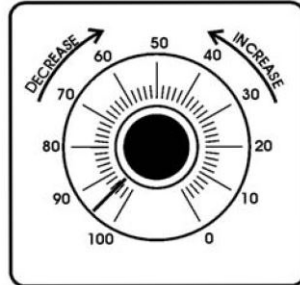


Figure 13-2 Door Heater Control

Initially, the units leave the factory with the dial set at 40. If desired, the amount of heat can later be reduced until moisture appears on the door. However, in fluctuating ambient conditions, it is recommended that a minimum of 40% door heat be used.

Clean/Adjust Steam Generator

Depending upon the quality of water used in the humidification system, it may be necessary to clean the humidity steam generator (P/N 1900190) more frequently than once a year.

Materials Required:

6-foot stepladder
 Flat and Phillips screwdrivers
 11/32 Nutdriver or wrench
 Laboratory disinfectant
 9/16 Open end wrench
 1/2 Open end wrench
 Sponge & cleaning materials



De-energize all potential sources of energy to this unit and lockout/tagout their controls.

1. Remove all contents from the environmental chamber, turn it off, and disconnect from power source.
2. Turn off the valve supplying the sterile distilled water.
3. From the stepladder, remove the eight screws securing the top of the environmental chamber cabinet.
4. When the steam generator has cooled, remove the four thumbscrews and wingnuts (Figure 13-3).

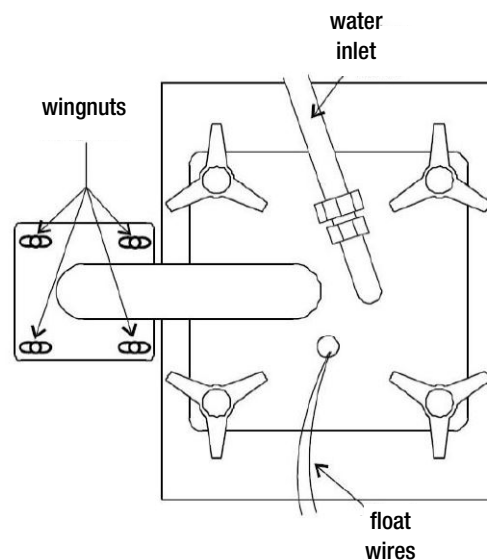


Figure 13-3 Access to Steam Generator

5. Disconnect water inlet from steam generator.



The internal temperature of the steam generator is hot enough to boil water. Make certain, sufficient time is allowed for the unit to completely cool before removing the top.

6. Lift the top off the steam generator and set it aside.
7. Remove the gasket and inspect for damage or excessive wear. Replace if necessary.
8. Loosen the four nuts holding the front cover and remove it. Mark the top of heater location for future reference. Unsnap the two toggle clamps on the heater.
9. Remove the can through the top of the steam generator, taking care not to spill water out of the can. Empty the water. Clean the can with a good quality laboratory detergent and disinfectant. Do not use any type of chloride cleaner. A bristle brush may be needed for stubborn rust and scale. Also clean the inside of the steam tube using a test tube brush. Repeat cleaning with soap and water as necessary.
10. Reassemble in reverse order being sure to align the heater with the reference mark. Center the can within the housing and the gasket with the can opening.

Change PID Tuning

The procedure for changing PID tuning values follows.

1. Remove software lockout, if not already performed.
2. From home screen, press and hold the “UP” and “DOWN” arrow keys until the display reads “Oper” in the lower display and “Ai” in the upper display.
3. Press the “DOWN” arrow key until “LOOP” appears in the upper display.
4. Press the “ADVANCE” key until “h.Pd” appears in the lower display.
5. Press the “UP” and/or “DOWN” arrow keys to set the value in the upper display.
6. Press the “ADVANCE” key until “c.Pd” appears in the lower display.
7. Press the “UP” and/or “DOWN” arrow keys to set the value in the upper display.
8. Press the “ADVANCE” key until “ti” appears in the lower display.
9. Press the “UP” and/or “DOWN” arrow keys to set the value in the upper display.
10. Press the “ADVANCE” key until “td” appears in the lower display.
11. Press the “UP” and/or “DOWN” arrow keys to set the value in the upper display.
12. Press the “Infinity” key to return to home screen.
13. Return software lockout to its prior settings.

If the above RH PID parameters do not provide the desired control, the RH controller has an Auto Tune feature that can be initiated. Please follow the Watlow PM Control Auto Tune procedure below.

Watlow PM Control Auto Tune

Prior to performing an RH controller auto tune, heat output 2 in the RH controller should be configured to have a minimum output of 10% due to heater lag in the RH system. Additionally, the cabinet should be running a minimum of 24 hours at the desired temperature control setpoint. This will help ensure the steam generator is at a good operating temperature and the cabinet has reached equilibrium before the auto tune is performed.

See procedure below for setting the minimum output low setting to 10% in the RH controller.

Changing RH Control Output 2 Minimum Output to 10%

1. Remove software lockout.
2. Go into SET UP menu by holding the up and down arrow keys for 6seconds (lower display reads "Set", upper display "Ai").
3. Go to OUTPUT menu by pressing the down arrow key until "OtPt" appears in the upper display.
4. Press the ADVANCE key once (lower display reads "OtPt" and upper display "1").
5. Press the up arrow key once (lower display reads "OtPt", upper display "2").
6. Press the ADVANCE key. The lower display reads "o.Lo". Press the up arrow key until the upper display reads "10".
7. Press the INFINITY key several times until the control returns to normal display.

NOTE

RH control minimum output value should remain at 10% after performing Auto Tune. This provides tighter RH control for most settings.

Auto Tune Procedure

The procedure for changing PID tuning values follows.

1. Remove software lockout, if not already performed.
2. From home screen, press and hold the up and down arrow keys until the display reads "Oper" in the lower display and "Ai" in the upper display.
3. Press the down arrow key until "LOOP" appears in the upper display.
4. Press the ADVANCE key until "A.Tun" appears in the lower display.
5. Press the up arrow key until "YES" appears in the upper display.
6. Press the INFINITY key to return to home screen.

The lower display flashes "TUNE" until Auto Tune has successfully completed.

Configuration Record

TEMPERATURE CONFIGURATION RECORD (WATLOW PM8)								
MODELS:		3906, 3909, 3928, 3942 & 3943						
JOB NUMBER:								
UNT SERIAL NUMBER:								
CONTROL TYPE:		Temperature						
PREPARED BY:		GLS		DATE		24-Sep-2012		
Operations Page: (Press "UP" and "DN" keys for 3 sec.)								
Ai:	Ai 1		Ai 2		§ = AC.Pu in version 10 firmware			
	§(Ain)	---	§(Ain)	---				
	i.Er	*	i.Er	nSrc				
	i.CA	@	i.CA	@				
Lnr:	Lnr 1		Lnr 2					
	Su.A	*	Su.A	*				
	oFSt	@	oFSt	@				
	o.u	*	o.u	*				
Pu:	Pu 1		Pu 2					
	Su.A	*	Su.A	*				
	oFSt	@	oFSt	@				
	o.u	*	o.u	*				
dio:	dio 5		dio 6					
	di.S	oFF	do.6	oFF				
	Ei.S	iACT						
Mon:	C.MA	Auto	C.Pr	*	Pu.A	*		
	h.Pr	*	C.SP	*				
Loop:	r.En	no	Aut	no	h.Pb	2.3	td	12
	C.M	AUto	C.SP	*	c.Pb	1.3	db	0.0
	A.tSP	90	id.S	23.9	ti	90	o.SP	0.0
ALM:	ALM 1		ALM 2		ALM 3		ALM 4	
	A.Lo	-20.0	A.Lo	32.0	A.Lo	32.0	A.Lo	32.0
	A.hi	34.0	A.hi	300.0	A.hi	300.0	A.hi	300.0
	¹ (A.St)	*	¹ (A.St)	*	¹ (A.St)	*	¹ (A.St)	*
P.StA:	P.Str	1	Ent1	oFF	JC	0		
	P.Acr	nonE	Ent2	oFF				
(P.AtA group parameters are for Ramp/Soak programming only)								
Setup Page: (Press "UP" and "DN" keys for 6 sec.)								
Ai:	Ai 1		Ai 2					
	SEn	rO.IH	dEC	0.0	SEn	oFF	¹ (i.CA)	@
	rt.L	3	¹ (i.CA)	@	FiL	0.5	¹ (Ain)	*
	FiL	2.0	¹ (Ain)	*	i.Er	oFF	¹ (i.Er)	*
	i.Er	oFF	¹ (i.Er)	*	dEC	0		
Lnr:	Lnr 1		Lnr 2		(All other parameters at default values)			
	Fn	oFF	Fn	oFF				
Pu:	Pu 1		Pu 2					
	Fn	oFF	Fn	oFF				
	FiL	0.0	FiL	0.0				
dio:	dio 5		dio 6					
	dir	oFF	dir	oFF				
	Fn	0.0	Fn	0.0				

TEMPERATURE CONFIGURATION RECORD (WATLOW PM8)									
MODELS:		3906, 3909, 3928, 3942 & 3943							
JOB NUMBER:									
UNT SERIAL NUMBER:									
CONTROL TYPE:		Temperature							
PREPARED BY:		GLS		DATE	24-Sep-2012				
Operations Page: (Press "UP" and "DN" keys for 3 sec.)									
LoopP:	h.AG	Pid	¹ (db)	0.0	L.dE	no	SP.hi	100.0	
	C.Ag	Pid	t.tUn	no	rP	oFF	¹ (o.SP)	*	
	C.Cr	oFF	¹ (A.tSP)	90	L.SP	-20.0	¹ (C.M)	*	
	¹ (h.Pb)	2.3	t.Agr	Cr it	h.SP	60.0			
	¹ (c.Pb)	1.3	P.dL	0.0	¹ (C.SP)	*			
	¹ (ti)	90	UFA	USEr	¹ (id.S)	23.9			
	¹ (td)	12	FAiL	USEr	SP.Lo	-100.0			
otPt:	otPt 1		otPt 2		otPt 3		r.Lo	-20.0	
	Fn	CooL	Fn	hEAt	o.ty	MA	r.hi	80.0	
	o.tb	30.0	o.Ct	Ftb	Fn	rMt	o.CA	@	
	o.Lo	0	o.tb	5.0	r.Sr	Ai			
	o.hi	100	o.Lo	0	Fi	1	otPt 4		
			o.hi	100	S.Lo	4.00	Fn	ALM	
					S.hi	20.00	Fi	1	
ALM:	ALM 1		ALM 1		ALM 1		ALM 2		
	A.ty	Pr.AL	A.Sd	both	A.Si	oFF	A.ty	oFF	
	Sr.A	Ai	¹ (A.Lo)	-20.0	A.dSP	oFF	ALM 3		
	i.S.A	1	¹ (A.hi)	34.0	¹ (A.dL)	0	A.ty	oFF	
	A.hy	0.6	A.LA	nLAt	¹ (A.St)	*	ALM 4		
	A.Lg	AL C	A.bL	oFF			A.ty	oFF	
FUn:	FUn 1		FUn 2						
	LEv	high	LEv	high					
	Fn	nonE	Fn	nonE					
	Fi	0	Fi	0					
gLbL:	C_F	C	gSE	oFF	C.LEd	both	d.ti	0	
	AC.LF	60	Si.A	5	ZonE	oFF	Usr.S	nonE	
	r.tyP	ti	Si.b	6	ChAn	oFF	Usr.r	nonE	
	P.tyP	StPt	Pot i	0	d.PrS	1			
CoM:	Ad.S	1	MAP	1	nU.S	yES			
rtC:	hoUr	@	Min	@	doW	@			
Factory Page: (Press "Infinity" and "Advance" keys for 6 sec.)									
LoC:	LoC.o	2	PAS.E	oFF	SLoC	1\$			
	LoC.P	3	rLoC	1\$					
CUSr:	CUSr 1		CUSr 2		CUSr 3		CUSr 4 thru 20		
	PAr	AC.Pu	PAr	AC.SP	PAr	P.ACr	PAr	nonE	
	* Displays current controller value (Display only)								
	\$ LOC could be set at 5 until factory testing and calibration is complete								
	@ This is a calibration factor and will vary from unit to unit								
	¹ Indicates parameters added in version 11.00 control firmware. Not present in ver. 10.00								

HUMIDITY CONFIGURATION RECORD (WATLOW PM8)

MODELS: 3906, 3909, 3928, 3942 & 3943
JOB NUMBER: _____
UNT SERIAL NUMBER: _____
CONTROL TYPE: Humidity
PREPARED BY: GLS **DATE** 24-Sep-2012

Operations Page: (Press "UP" & "DN" keys for 3 sec.)

Ai:	Ain	<u>*</u>	i.Er	<u>*</u>	i.CA	<u>@</u>
Lnr:	Su.A	<u>*</u>	oFST	<u>@</u>	o.u	<u>*</u>
Pu:	Su.A	<u>*</u>	oFST	<u>@</u>	o.u	<u>*</u>
dio:	dio 5		dio 6			
	di.S	<u>oFF</u>	do.S	<u>oFF</u>		
	Ei.S	<u>iAct</u>				
Mon:	C.MA	<u>Auto</u>	C.Pr	<u>*</u>	Pu.A	<u>*</u>
	h.Pr	<u>*</u>	C.SP	<u>*</u>		
Loop:	C.M	<u>AUto</u>	C.SP	<u>*</u>	c.Pb	<u>3.8 (4)</u>
	A.tSP	<u>100</u>	id.S	<u>75.0 (75)</u>	ti	<u>51</u>
	AUt	<u>no</u>	h.Pb	<u>6.0 (6)</u>	td	<u>8</u>
ALM:	ALM 1		ALM 2		ALM 3	
	A.Lo	<u>0.0 (0)</u>	A.Lo	<u>32.0</u>	A.Lo	<u>32.0</u>
	A.hi	<u>100.0 (100)</u>	A.hi	<u>300.0</u>	A.hi	<u>300.0</u>
	¹ (A.St)	<u>*</u>	¹ (A.St)	<u>*</u>	¹ (A.St)	<u>*</u>
P.StA:	P.Str (1 thru 40)		Ent1	<u>oFF</u>	JC	<u>0</u>
	P.ACr <u>nonE</u>		Ent2	<u>oFF</u>		

(P.AtA group parameters are for Ramp/Soak programming only)

Setup Page: (Press "UP" & "DN" keys for 6 sec.)

Ai:	SEn	<u>voLt</u>	r.Lo	<u>0 (0)</u>	i.Er	<u>oFF</u>	¹ (i.Er)	<u>*</u>
	Unit	<u>rh</u>	r.hi	<u>100 (100)</u>	dEC	<u>0</u>		
	S.Lo	<u>0.00</u>	P.EE	<u>oFF</u>	¹ (i.CA)	<u>@</u>		
	S.hi	<u>5.00</u>	FiL	<u>2.0</u>	¹ (Ain)	<u>*</u>		
Lnr:	Fn	<u>oFF</u>	(All other parameters at default values)					
Pu:	Fn	<u>oFF</u>	FiL	<u>0.0</u>				
dio:	dio 5		dio 6					
	dir	<u>in</u>	dir	<u>otPt</u>				
	LEv	<u>high</u>	Fn	<u>oFF</u>				
	Fn	<u>nonE</u>						
	Fi	<u>0</u>						
Loop:	h.Ag	<u>Pid</u>	¹ (db)	<u>1.0 (0)</u>	L.dE	<u>no</u>	SP.hi	<u>100.0</u>
	C.Ag	<u>Pid</u>	t.tUn	<u>no</u>	rP	<u>oFF</u>	¹ (o.SP)	<u>24.0</u>
	C.Cr	<u>oFF</u>	¹ (A.tSP)	<u>100</u>	L.SP	<u>0.0 (0)</u>	¹ (C.M)	<u>Auto</u>
	¹ (h.Pb)	<u>6.0 (6)</u>	t.Agr	<u>Cr it</u>	h.SP	<u>100.0 (100)</u>		
	¹ (c.Pb)	<u>3.8 (4)</u>	P.dL	<u>0.0</u>	¹ (C.SP)	<u>*</u>		
	¹ (ti)	<u>51</u>	UFA	<u>0</u>	¹ (id.S)	<u>75.0 (75)</u>		
	¹ (td)	<u>8</u>	FAiL	<u>USer</u>	SP.Lo	<u>-100.0</u>		
otPt:	otPt 1		otPt 2		otPt 3		r.Lo	<u>0</u>
	Fn	<u>CoOL</u>	Fn	<u>hEAt</u>	o.ty	<u>MA</u>	r.hi	<u>100</u>
	o.tb	<u>10.0</u>	o.Ct	<u>utb</u>	Fn	<u>rMt</u>	o.CA	<u>@</u>
	o.Lo	<u>0</u>	o.Lo	<u>0</u>	r.Sr	<u>Ai</u>		
	o.hi	<u>100</u>	o.hi	<u>100</u>	Fi	<u>1</u>	otPt 4	
					S.Lo	<u>4.00</u>	Fn	<u>ALM</u>
					S.hi	<u>20.00</u>	Fi	<u>1</u>

HUMIDITY CONFIGURATION RECORD (WATLOW PM8)

MODELS: 3906, 3909, 3928, 3942 & 3943
JOB NUMBER: _____
UNT SERIAL NUMBER: _____
CONTROL TYPE: Humidity
PREPARED BY: GLS **DATE** 24-Sep-2012

ALM:	<u>ALM 1</u>	<u>ALM 1</u>	<u>ALM 1</u>	<u>ALM 2</u>			
A.ty	<u>Pr.AL</u>	¹ (A.Lo)	<u>0.0 (0)</u>	A.dSP	<u>on</u>	A.ty	<u>oFF</u>
Sr.A	<u>Ai</u>	¹ (A.hi)	<u>100.0 (100)</u>	¹ (A.dL)	<u>0</u>	<u>ALM 3</u>	
A.hy	<u>0.3 (0)</u>	A.LA	<u>nLA^t</u>	¹ (A.St)	<u>*</u>	A.ty	<u>oFF</u>
A.Lg	<u>AL C</u>	A.bL	<u>oFF</u>	<u>ALM 4</u>			
A.Sd	<u>both</u>	A.Si	<u>on</u>	A.ty	<u>oFF</u>		

FUn:	<u>FUn 1</u>	<u>FUn 2</u>	
LEv	<u>high</u>	LEv	<u>high</u>
Fn	<u>SiL</u>	Fn	<u>SiL</u>
Fi	<u>1</u>	Fi	<u>1</u>

gLbL: C.F	<u>C</u>	gSE	<u>oFF</u>	C.LEd	<u>oFF</u>	d.ti	<u>0</u>
AC.LF	<u>60</u>	Si.A	<u>5</u>	ZonE	<u>oFF</u>	USr.S	<u>nonE</u>
r.tyP	<u>ti</u>	Si.b	<u>6</u>	ChAn	<u>oFF</u>	USr.r	<u>nonE</u>
P.tyP	<u>StPt</u>	Pot i	<u>0</u>	d.PrS	<u>1</u>		

CoM: Ad.S	<u>1</u>	MAP	<u>1</u>	nUS	<u>yES</u>
------------------	----------	-----	----------	-----	------------

rtC: hoUr	<u>@</u>	Min	<u>@</u>	doW	<u>@</u>
------------------	----------	-----	----------	-----	----------

Factory Page: (Press "Infinity" & "Advance" keys for 6 sec.)

LoC: LoC.o	<u>2</u>	PAS.E	<u>oFF</u>	SLoC	<u>1\$</u>
LoC.P	<u>3</u>	rLoC	<u>1\$</u>		

CUS^t:	<u>CUS^t: 1</u>	<u>CUS^t: 2</u>	<u>CUS^t: 3</u>	<u>CUS^t: 4 thru 20</u>			
PAr	<u>AC.Pu</u>	PAr	<u>AC.SP</u>	PAr	<u>P.AC^r</u>	PAr	<u>nonE</u>

* Displays current controller value. (Display only)

\$ LOC should be set at 5 until factory testing and calibration is complete.

@ This is a calibration factor and will vary from unit to unit.

() Parameter values in parenthesis are seen in version 11.00 and later firmware controls.

¹ Indicates parameters added in version 11.00 control firmware. Not present in ver. 10.00

CO2 CONFIGURATION RECORD (WATLOW PM6)									
MODELS:		3909							
JOB NUMBER:									
UNT SERIAL NUMBER:									
CONTROL TYPE:		CO2							
PREPARED BY:		GLS			DATE		17-Jun-2015		
Program Page:									
See Programming Sheets if required.*									
Operations Page: (Press "UP" and "DN" keys for 3 sec.)									
Ai:	Ain	*	i.Er	*	i.CA	@			
Lnr:	Su.A	*	oFST	@	o.u	*			
Pu:	Su.A	*	oFST	@	o.u	*			
Mon:	C.MA	*	h.Pr	*	C.SP	*	Pu.A	*	
Loop:	C.M	AUTO	C.SP	*	ti	310	o.SP	0.0	
	A.tSP	90	id.S	5.0	td	10			
	AuT	no	h.Pb	1.5	db	0.0			
ALM:	ALM 1		ALM 2		ALM 3		ALM 4		
	A.Lo	-1.0	A.Lo	32.0	A.Lo	32.0	A.Lo	32.0	
	A.hi	21.0	A.hi	300.0	A.hi	300.0	A.hi	300.0	
	¹ (A.St)	*	¹ (A.St)	*	¹ (A.St)	*	¹ (A.St)	*	
Setup Page: (Press "UP" and "DN" keys for 6 sec.)									
Ai:	SEn	VOLT	r.Lo	0 (0)	i.Er	oFF	¹ (i.Er)	*	
	Unit	Pro	r.hi	20.0	dEC	0.0			
	S.Lo	0.00	P.EE	oFF	¹ (i.CA)	@			
	S.hi	1.00	FiL	2.0	¹ (Ain)	*			
Lnr:	Fn	oFF	(All other parameters at default values)						
Pu:	Fn	oFF	FiL	0.0					
Loop:	h.AG	Pid	t.tUn	no	rP	oFF	SP.hi	100.0	
	C.Ag	oFF	¹ (A.tSP)	90	L.SP	0.0	¹ (o.SP)	0.0	
	¹ (h.Pb)	1.5	t.Agr	Cr it	h.SP	20.0	¹ (C.M)	AUTO	
	¹ (ti)	310	UFA	USEr	¹ (C.SP)	*			
	¹ (td)	10	FAiL	oFF	¹ (id.S)	5.0			
	¹ (db)	0.0	L.dE	no	SP.Lo	-100.0			
otPt:	otPt 1		otPt 2		otPt 3		S.hi	20.00	
	Fn	hEAt	Fn	ALM	o.ty	MA	r.Lo	0.0	
	o.tb	10.0	Fi	1	Fn	rMt	r.hi	20.00	
	o.Lo	0			r.Sr	Ai	o.CA	0.0	
	o.hi	100			Fi	1			
					S.Lo	4.00			
ALM:	ALM 1		ALM 1		ALM 1		ALM 2		
	A.ty	Pr.AL	¹ (A.Lo)	-1.0	A.dSP	on	A.ty	oFF	
	Sr.A	Ai	¹ (A.hi)	21	¹ (A.dL)	0	ALM 3		
	A.hy	0.3	A.LA	nLAt	¹ (A.St)	*	A.ty	oFF	
	A.Lg	ALo	A.bl	oFF				ALM 4	
	A.Sd	both	A.Si	on	A.ty	oFF			
FUn:	LEv	high	Fn	SiL	Fi	1			
gLBL:	C_F	C	ZonE	oFF	d.ti	0			
	AC.LF	60	ChAn	oFF	U.Sr.S	nonE			
	C.LEd	oFF	d.PrS	1	U.Sr.r	nonE			
CoM:	Ad.S	1	MAP	1	nU.S	yES			
Factory Page: (Press "Infinity" and "Advance" keys for 6 sec.)									
LoC:	LoC.o	2	PAS.E	oFF	rLoC	1\$	SLoC	1\$	
CUSt:	CUSt 1		CUSt 2		CUSt 3 thru 20				
	PAr	AC.Pu	PAr	AC.SP	PAr	nonE			
* Displays current controller value (Display only)									
\$ LOC should be set at 5 until factory testing and calibration is complete									
@ This is a calibration factor and will vary from unit to unit									

CO2 CONFIGURATION RECORD (WATLOW PM6)										
MODELS:		3928 & 3942								
JOB NUMBER:										
UNT SERIAL NUMBER:										
CONTROL TYPE:		CO2								
PREPARED BY:		GLS		DATE	17-Jun-2015					
Program Page:										
See Programming Sheets if required.*										
Operations Page: (Press "UP" and "DN" keys for 3 sec.)										
Ai:	Ain	*	i.Er	*	i.CA	@				
Lnr:	Su.A	*	oFST	@	o.u	*				
Pu:	Su.A	*	oFST	@	o.u	*				
Mon:	C.MA	*	h.Pr	*	C.SP	*	Pu.A	*		
LooP:	C.M	Auto	C.SP	*	ti	80	o.SP	0.0		
	A.tSP	90	id.S	5.0	td	0				
	AUt	no	h.Pb	1.5	db	0.0				
ALM:	ALM 1		ALM 2		ALM 3		ALM 4			
	A.Lo	-1.0	A.Lo	32.0	A.Lo	32.0	A.Lo	32.0		
	A.hi	21.0	A.hi	300.0	A.hi	300.0	A.hi	300.0		
	¹ (A.St)	*	¹ (A.St)	*	¹ (A.St)	*	¹ (A.St)	*		
Setup Page: (Press "UP" and "DN" keys for 6 sec.)										
Ai:	SEn	VOLT	r.Lo	0.0	i.Er	oFF	¹ (i.Er)	*		
	Unit	Pro	r.hi	20.0	dEC	0.0				
	S.Lo	0.00	P.EE	oFF	¹ (i.CA)	@				
	S.hi	1.00	FiL	2.0	¹ (Ain)	*				
Lnr:	Fn	oFF	(All other parameters at default values)							
Pu:	Fn	oFF	FiL	0.0						
LooP:	h.AG	Pid	t.tUn	no	rP	oFF	SP.hi	100.0		
	C.Ag	oFF	¹ (A.tSP)	90	L.SP	0.0	¹ (o.SP)	0.0		
	¹ (h.Pb)	1.0	t.Agr	Cr it	h.SP	20.0	¹ (C.M)	Auto		
	¹ (ti)	80	UFA	USEr	¹ (C.SP)	*				
	¹ (td)	0	FAiL	oFF	¹ (id.S)	5.0				
	¹ (db)	0.0	L.dE	no	SP.Lo	-100.0				
otPt:	otPt 1		otPt 2		otPt 3		S.hi	20.00		
	Fn	hEAt	Fn	ALM	o.ty	MA	r.Lo	0.0		
	o.tb	10.0	Fi	1	Fn	rMt	r.hi	20.00		
	o.Lo	0			r.Sr	Ai	o.CA	0.0		
	o.hi	100			Fi	1				
				S.Lo	4.00					
ALM:	ALM 1		ALM 1		ALM 1		ALM 2			
	A.ty	Pr.AL	¹ (A.Lo)	-1.0	A.dSP	on	A.ty	oFF		
	Sr.A	Ai	¹ (A.hi)	21.0	¹ (A.dL)	0	ALM 3			
	A.hy	0.3	A.LA	nLAt	¹ (A.St)	*	A.ty	oFF		
	A.Lg	AL o	A.bl	oFF				ALM 4		
	A.Sd	both	A.Si	on				A.ty	oFF	
	FUN:	LEv	high	Fn	SiL	Fi	1			
gLbL:	C_F	C	ZonE	oFF	d.ti	0				
	AC.LF	60	ChAn	oFF	Usr.S	nonE				
	C.LEd	oFF	d.PrS	1	Usr.r	nonE				
CoM:	Ad.S	1	MAP	1	nU.S	yES				
Factory Page: (Press "Infinity" and "Advance" keys for 6 sec.)										
LoC:	LoC.o	2	PAS.E	oFF	rLoC	1\$	SLoC	1\$		
CUST:	CUST 1		CUST 2		CUST 3 thru 20					
	PAr	AC.Pu	PAr	AC.SP	PAr	nonE				
* Displays current controller value (Display only)										
\$ LOC could be set at 5 until factory testing and calibration is complete										
@ This is a calibration factor and will vary from unit to unit										
¹ Indicates parameters added in version 11.00 control firmware. Not present in ver. 10.00										

Honeywell Truline Configuration Record

HONEYWELL TRULINE CONFIGURATION RECORD

SHT 1 OF 4

CUSTOMER: _____
 JOB NUMBER: _____
 UNIT SERIAL #: _____
 CONTROL TYPE: _____
 PREPARED BY: _____ DATE: / /
 COMPLETED BY: _____ DATE: / /

GROUP PROMPT	FUNCTION PROMPT	VALUE OR SELECTION	
TUNING1	PROP BD or GAIN		
	RATE MIN		
	RSET MIN or RESET RPM or MAN RSET		
	CYCSEC		
	PROP BD2 or GAIN2		
	RATE2MIN		
	RSET2MIN or RSET2RPM		
	CYC2SEC		
	TUNING2	PROP BD or GAIN	
		RATE MIN	
RSET MIN or RSET PRM or MAN RSET			
CYCSEC			
PROP BD2 or GAIN2			
RATE2MIN			
RSET2MIN or RSET2RPM			
CYC2SEC			
SP RAMP1		SP RAMP	
		TIME MIN	
	FINAL SP		
	SP RATE		
	EU/HR UP		
	EU/HR DN		
SP RAMP2	SP RAMP		
	TIME MIN		
	FINAL SP		
	SP RATE		
	EU/HR UP		
	EU/HR DN		
	SP PROG		

GROUP PROMPT	FUNCTION PROMPT	VALUE OR SELECTION
CHART	CHRTSPD	7 DAY
	HOUR/REV	
	TIME DIV	21
	MINOR DIV	FOUR
	CONTINUE	NO
	CHART NAME	
	HEADER	YES
	REMSW	NONE
	WAKEMIN	
	WAKE HR	
	WAKE DAY	
WAKE MON		
TIME	MINUTES	(CURRENT)
	HOURS	(CURRENT)
	DAY	(CURRENT)
	MONTH	(CURRENT)
	YEAR	(CURRENT)
	DAY	(CURRENT)
PEN1	PEN1	ENABLE
	PEN1IN	INPUT 1
	CHART1HI	80
	CHART1LO	-20
	PEN1ON	
	PEN1OFF	
	MAJORDIV	10
	MINORDIV	10
RNG1TAG	TEMP	
PEN2	PEN2	ENABLE
	PEN2IN	INPUT 2
	CHART2HI	100
	CHART2LO	0
	PEN2ON	
	PEN2OFF	
	MAJORDIV	10
	MINORDIV	10
RING2TAG	% RH	
PEN3	PEN3	DISABLE
	PEN3IN	
	CHART3HI	
	CHART3LO	
	PEN3ON	
	PEN3OFF	
	MAJORDIV	
	MINORDIV	
RING 3 TAG		

HONEYWELL TRULINE CONFIGURATION RECORD

SHT 2 OF 4

GROUP PROMPT	FUNCTION PROMPT	VALUE OR SELECTION
PEN4	PEN4	DISABLE
	PEN4IN	
	CHART4HI	
	CHART4LO	
	PEN4ON	
	PEN4OFF	
	MAJORDIV	
	MINORDIV	
	RNG4TAG	
INPUT1	DECIMAL	XXX.X
	UNITS	DEG C
	ENGUNITS	
	IN1TYPE	100 PT
	XMITTER	
	IN1HI	482.2
	IN1LO	-184.4
	CUTOFF	
	INPTCOMP	
	FILTER1	2
	BURNOUT	UP
INPUT2	DECIMAL	XXXX
	UNITS	EU
	ENGUNITS	RH
	IN2TYPE	0-5 V
	XMITTER	LINEAR
	IN2HI	100
	IN2LO	0
	CUTOFF2	
	INPTCOMP	
	FILTER2	2
	BURNOUT	UP
INPUT3	DECIMAL	
	UNITS	
	ENGUNITS	
	IN3TYPE	
	XMITTER	
	IN3HI	
	IN3LO	
	CUTOFF3	
	INPTCOMP	
	FILTER3	
	BURNOUT	

GROUP PROMPT	FUNCTION PROMPT	VALUE OR SELECTION
INPUT4	DECIMAL	
	UNITS	
	ENGUNITS	
	IN4TYPE	
	XMITTER	
	IN4HI	
	IN4LO	
	CUTOFF4	
	INPTCOMP	
	FILTER4	
	BURNOUT	
TOTAL1	(Value)	
	RESETTOT	
	TOTAL1	
	TOTALEU	
	RATE	
	SCALER	
	RSETABLE	
TOTAL2	(Value)	
	RSETTOT	
	TOTAL2	
	TOTALEU	
	RATE	
	RSETABLE	
CONTROL1	PID SETS	
	SW VALUE	
	SP SOURC	
	RATIO	
	BIAS	
	SP TRACK	
	POWER UP	
	SP HILIM	
	SP LOLIM	
	ACTION	
	OUT HILIM	
	OUT LOLIM	
	DROPOFF	
	DEADBAND	
	OUT HYST	
	FAILSAFE	
	REM SW	
	MAN KEY	
	PBarGAIN	
	MINorRPM	
CONT1ALG		
OUT1ALG		
4-20 RNG		
SHEDMODE		
SHED SP		

HONEYWELL TRULINE CONFIGURATION RECORD

SHT 3 OF 4

GROUP PROMPT	FUNCTION PROMPT	VALUE OR SELECTION
CONTROL2	PID SETS	
	SW VALUE	
	SP SOURC	
	RATIO	
	BIAS	
	SP TRACK	
	POWER UP	
	SP HILIM	
	SP LOLIM	
	ACTION	
	OUT HILIM	
	OUT LOLIM	
	DROPOFF	
	DEADBAND	
	OUT HYST	
	FAILSAFE	
	REM SW	
	MAN KEY	
	PBorGAIN	
	MINorRPM	
	CONT1ALG	
	OUT1ALG	
	4-20 RNG	
	SHEDMODE	
SHED SP		
OPTIONS	INPUT 1	ENABLE
	INPUT2	ENABLE
	INPUT3	DISABLE
	INPUT4	DISABLE
	CONTROL1	DISABLE
	CONTROL2	DISABLE
	REJFREQ	60 HZ
	HF REJ	ENABLE
	AUX OUT	DISABLE
	4mA VAL	
	20mA VAL	
	RELHUMID	NO
	ATMPRES	
	DEVIATION	NONE
	DEVSETPT	
	SCROLL	NONE
	INP ALG	
	COEFF	
	PV HIGH	
	PV LOW	
	RATIO A	
	BIAS A	
	RATIO B	
	BIAS B	
	RATIO C	
	BIAS C	
	GRANDTOT	
	ComSTATE	DISABLE
	ComADDR	
	SHEDTIME	
	UNITS	

GROUP PROMPT	FUNCTION PROMPT	VALUE OR SELECTION	
ALARMS	A1S1 VAL		
	A1S2 VAL		
	A1S1 TYPE	NONE	
	A1S2 TYPE	NONE	
	A1S1 HL		
	A1S1 EV		
	A1S2 HL		
	A1S2 EV		
	AL1 HYST	0.1	
	A2S1 VAL		
	A2S2 VAL		
	A2S1 TYPE	NONE	
	A2S2 TYPE	NONE	
	A2S1 HL		
	A2S1 EV		
	A2S2 HL		
	A2S2 EV		
	AL2 HYST		
	A3S1 VAL		
	A3S2 VAL		
	A3S1 TYPE		
	A3S2 TYPE		
	A3S1 HL		
	A3S1 EV		
	A3S2 HL		
	A3S2 EV		
	AL3 HYST		
	A4S1 VAL		
	A4S2 VAL		
	A4S1 TYPE		
	A4S2 TYPE		
	A4S1 HL		
	A4S1 EV		
	A4S2 HL		
	A4S2 EV		
	AL4 HYST		
	A5S1 VAL		
	A5S2 VAL		
	A5S1 TYPE		
	A5S2 TYPE		
	A5S1 HL		
	A5S1 EV		
	A5S2 HL		
	A5S2 EV		
	AL5 HYST		
	A6S1 VAL		
	A6S2 VAL		
	A6S1 TYPE		
	A6S2 TYPE		
	A6S1 HL		
	A6S1 EV		
	A6S2 HL		
	A6S2 EV		
	AL6 HYST		

Information

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