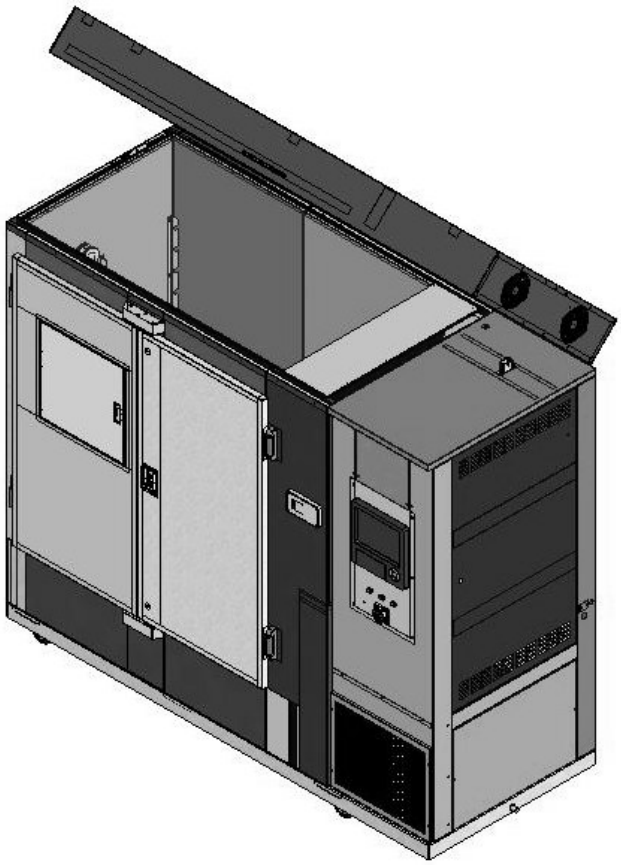
INSTRUCTION MANUAL

PLANT GROWTH CHAMBER (SGC170)



SGC170

CONTENTS

1. HEALTH AND SAFETY

Weiss Gallenkamp is required under the Health and Safety at Work, etc. Act. 1974 and other U.K. regulations as designers, manufacturers, suppliers and importers of articles for use at work to ensure that, as far as reasonably practicable, the product that we design, produce, supply or import are safe and without risk to health and safety, when properly used.

We are also required to provide information on the safety and handling precautions to be observed when installing, operating, maintaining and servicing our products. Such advice is contained in this manual.

We should also like to point out, however, that you as users have an important responsibility in the provision and maintenance of safe working practices and conditions. Accordingly we draw the following matters to your attention:

1. This apparatus should only be used as intended (see page 3), and within its design parameters by suitably qualified and trained personnel who have read and understood the relevant sections of this manual.

2. This manual should be readily available at all times.

3. In addition to that which is written in the manual, normal common sense safety precautions must be taken at all times to avoid the possibility of accidents. Particular care is required when working with apparatus at high temperatures or pressures.

4. Installation, maintenance, servicing and connection to electrical supplies, should only be carried out by suitably trained personnel. The Weiss Gallenkamp service department can provide these facilities if required.

5. If you are in any doubt whatsoever regarding the correct use of this apparatus, or if you require any technical data or assistance, please contact Weiss Gallenkamp Technical Support.

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NOTE: **CAUTION MUST BE ADHERED TO**

1. HEALTH AND SAFETY

Foreseen Use of Chamber

The SGC170 chamber has been specifically designed for tissue culture and the growing of plants. The chamber shall be operating within the specification (see page 53). The chamber is not designed for any other purpose.

2. UNPACKING AND CHECKING CONTENTS

1. Carefully remove all exterior packing materials and check for any damage that may have occurred during transit. ***DO NOT*** discard packing material until the chamber is fully operational. Report any damage immediately to your supplier.

NOTE:

If the Shock Detection Indication shows red:

- Do not reject the unit.
- Notify the shipping company representative before signing for the unit. When signing for the unit, note any comments on the acceptance document. Demand a copy of the acceptance document. If this is not possible, notify the shipping company in writing as soon as possible after taking delivery.
- Notify the company who supplied the unit to you.
- Carefully unpack and inspect the unit for damage. Report any damage found immediately to the shipping company and the supplier.
- Do not discard packing material.

2. Remove additional accessories, check the contents with the table below, and put them in a safe place.

3. Check the interior of the chamber and remove any packing materials from the shelves.

4. Ensure the lamp is securely fitted; the two pins on each end of the fluorescent tube (FL) must line up with the entry holes in the holders.

5. Report any interior damage immediately to your local supplier.

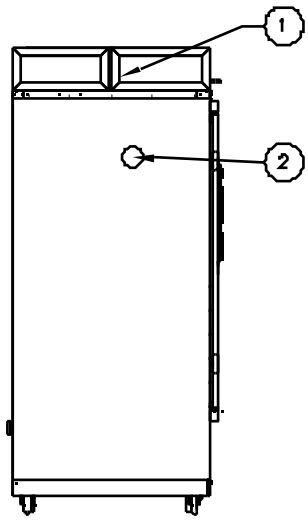
6. The chamber is now ready for pre-installation check and installation (see page 15).

Additional Accessories List

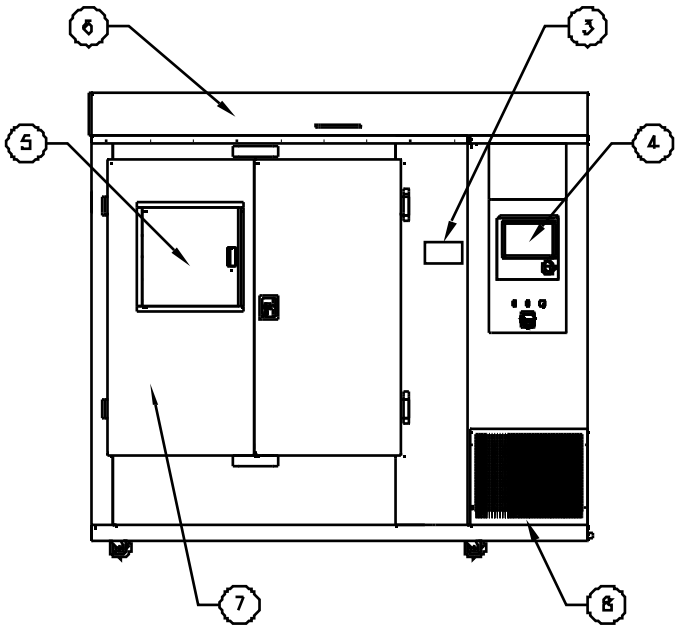
Following accessories are included:

No	Part Name	Description	Quantity
1	Instruction Manual	UM-SGC170	1
2	DAQSTANDARD Software CDROM		1
3	CX2000 User manual CDROM		1
4	CX2000 Operation Guide		1
5	100Mb Zip Disk		1
6	630mA Antisurge Fuse	E13033	1
7	Wire Mesh Shelves	K06607	2
8	Wire Mesh Support Rods	K06608	4
9	Main Door Key	K04346	1
10	Instrument Chamber Door Key		1

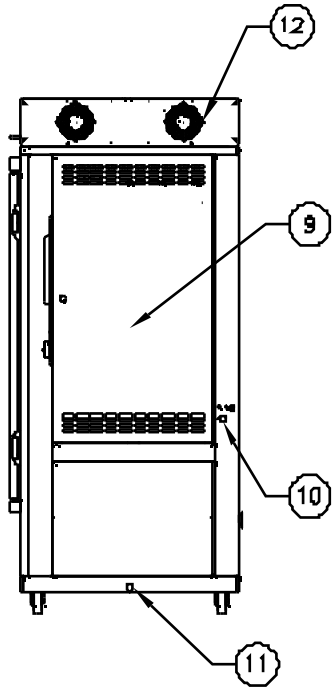
3. NAME AND FUNCTION OF PARTS



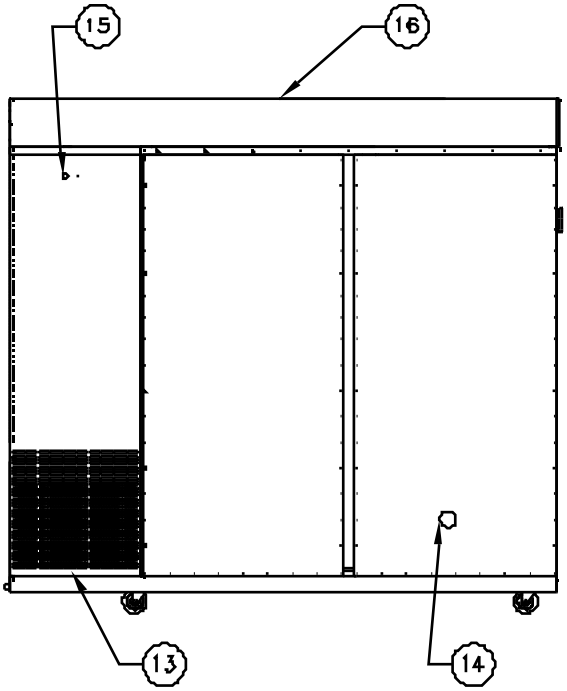
LHS VIEW



FRONT VIEW



RHS VIEW



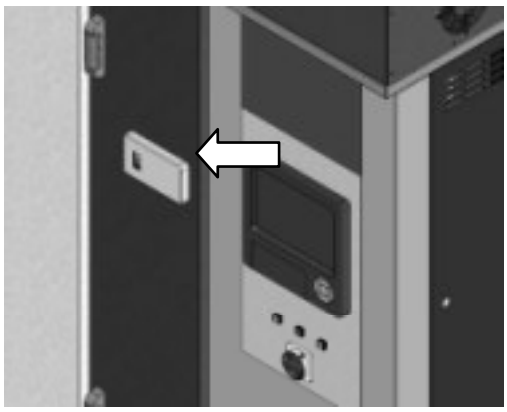
REAR VIEW

3. NAME AND FUNCTION OF PARTS

1. **Air Inlet for Lamp Box**
   Air inlet For cooling of the lamps and ballasts
2. **Access Port**
   Situated on the left hand side of the chamber. See page 11
3. **Air Exchange**
   See page 7
4. **Control Panel**
   See page 8
5. **Inspection Door**
   Pull door open to view samples inside chamber
6. **Lamp Box**
7. **Main Chamber Doors**
8. **Refrigeration Air Inlet Grille**
9. **Instrument Panel Door**
   Remove/Open cover to gain access to the condensing unit/electrical components for servicing.
10. **Purified Water Inlet**
    See page 13
11. **Wastewater drain**
    See page 13
12. **Lamp Box Fans**
    See page 12
13. **Refrigeration Air Outlet Grille**
14. **Air Vent**
15. **Mains Electrical Cable Inlet**
    See page 15 and 17
16. **Lamp box Access Panel**
    Remove cover to gain access to the lamp ballasts for servicing

3. NAME AND FUNCTION OF PARTS

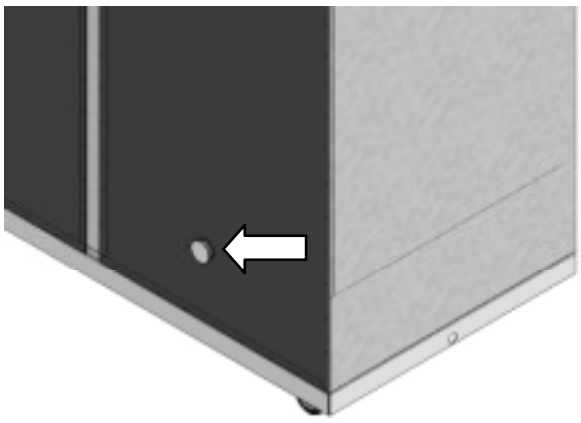
Air Exchange



An adjustable air vent is provided on the front of the chamber, the air vent is opened by slide the hand to the right hand side.

Up to 6 air changes per hour can be achieved with the air vent opened to its maximum.

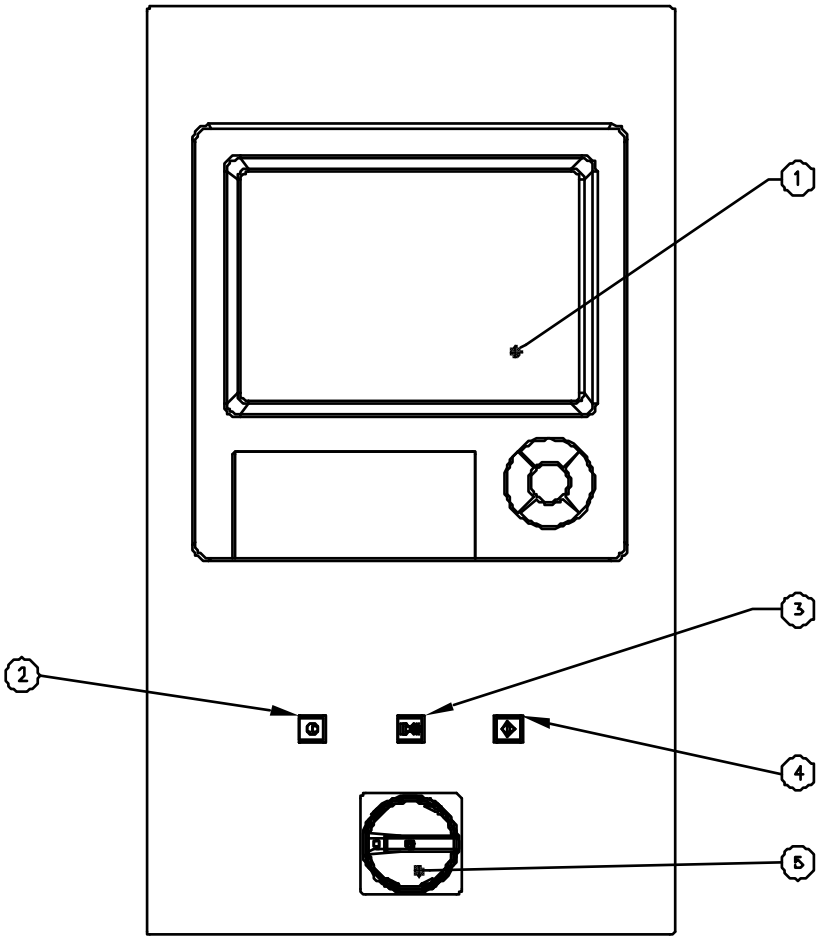
The silicone bung of the air vent should be removed at the rear of the chamber.



REAR OF CHAMBER.

3. NAME AND FUNCTION OF PARTS

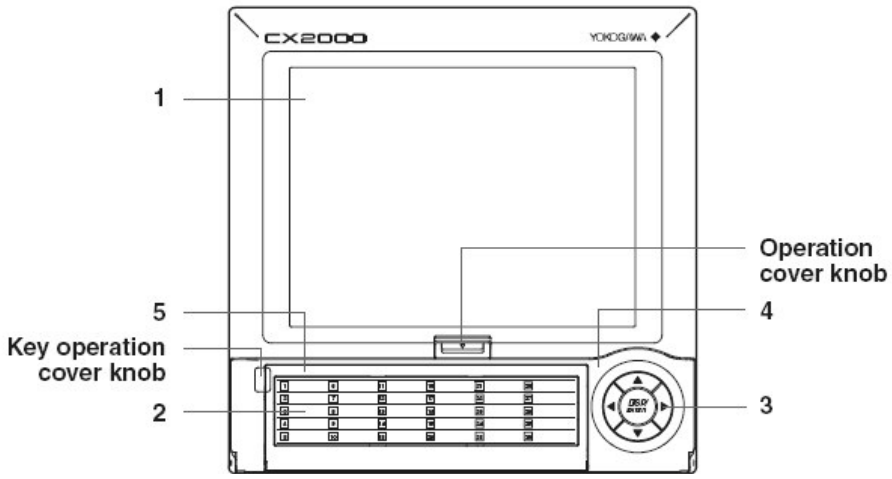
Control Panel Instrumentation



1	Programmable Controller / Recorder - See Separate manual for Operation and Programming
2	Mains Button
3	Reset Button
4	Mute Button
5	Mains Isolator

3. NAME AND FUNCTION OF PARTS

CX2000 Controller



Item Number	Description
1	LCD Screen
2	Identification Labels
3	Keys
4	Operation Cover
5	Key Operation Cover

LED Screen

Various screens appear in the LCD, such as the control group display and set up displays

Identification Label

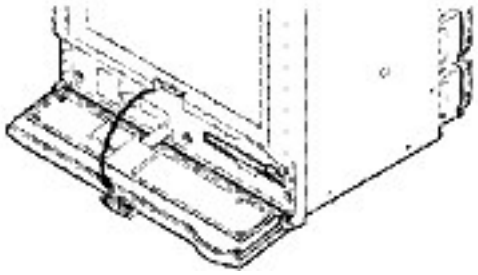
Used to identify each channel, write the appropriate label as needed

Keys

Includes the directional arrow keys as well as the DISP/ENTER key. In operation mode, these keys are used to switch between the operation displays. In the set up screens where functions are configured, the keys are used to select parameters and to confirm new settings

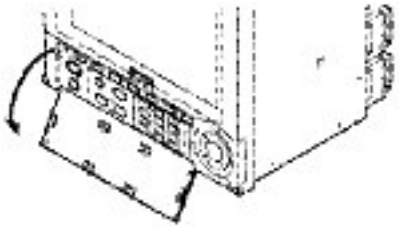
Operation Cover

The external storage medium - zip disk is situated behind the operation cover. To open the cover press down on the operation cover knob positioned at the top of the cover and then pull the cover forward. To remove the zip disk press the small eject button to the right of the zip disk. Note the disk can only be remove when there is power to the controller Ensure that the operation cover is closed at all times except when handling the zip disk



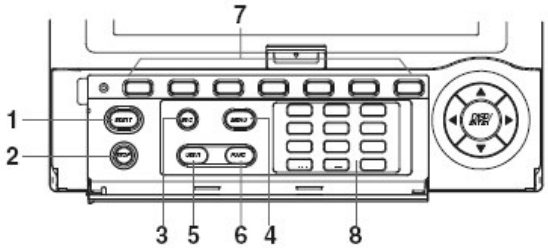
Key Operation Cover

This cover is opened to access to all of the other keys. The operation cover is opened by pulling the key operation cover knob at the centre left corner of the cover forward.



3. NAME AND FUNCTION OF PARTS

Key Operation

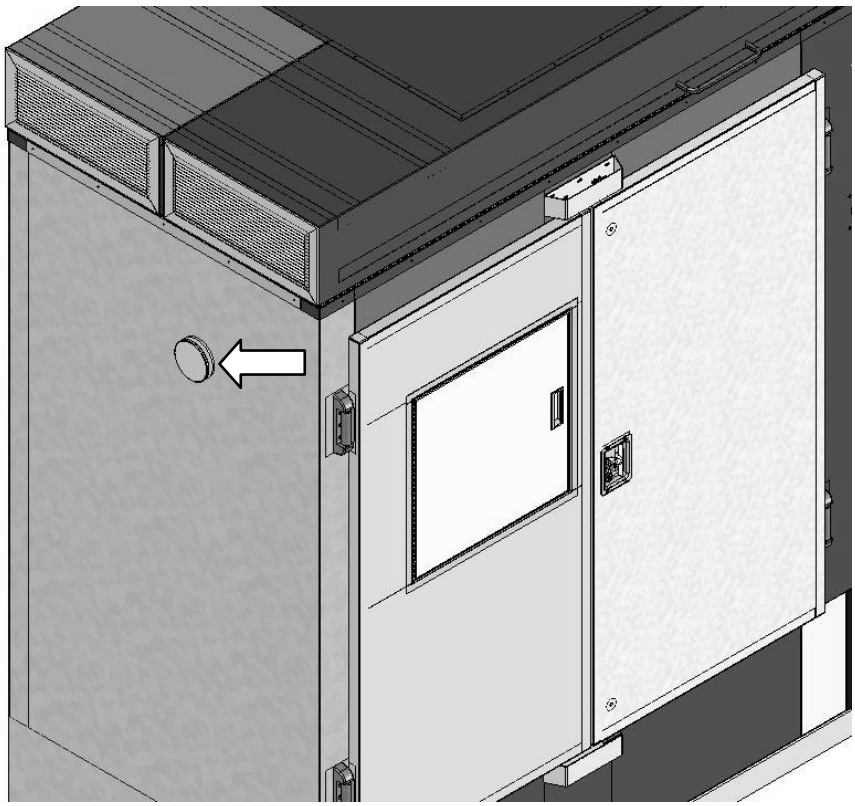


1. **Start Key** – Starts the data acquisition to the internal memory, and displays the waveform on the trend screen
2. **Stop Key** – Stops the data acquisition to the internal memory. Also stops the updating of the waveform on the trend screen.
3. **Esc Key** – Used when cancelling an operation. Also used when returning from the setting mode to operation mode
4. **Menu Key** – Used when switching from the operation mode to the setting mode. Also used when returning from setting mode to the operation mode
5. **User Key** – Used to execute the assigned action
6. **Func Key** – If the key is pressed in the operation mode, a soft key menu is displayed at the bottom of the screen enabling the execution of various functions. The key is also used when switching from setting mode to the operation mode.

7. **Soft Key** – When a soft key is displayed at the bottom section of the display in operation, setting, or basic setting mod, these soft keys are used to change the operation and set up information
8. **Character/Number Keys** – Used when entering characters or numbers.

3. NAME AND FUNCTION OF PARTS

Access Port

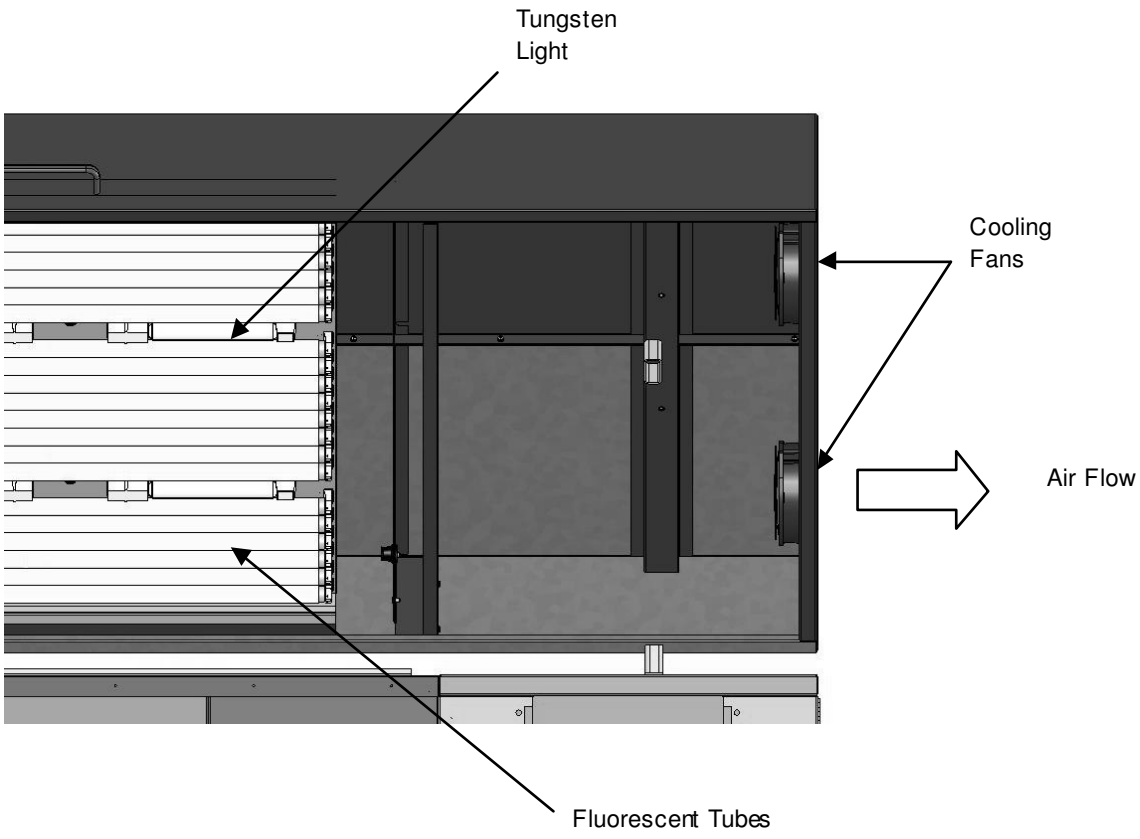


The access port is situated on the left-hand side of the chamber, the access port has two plugs fitted, and one inside and one outside, and both plugs need to be fitted to maintain the insulation of the chamber.

The plugs can be split or holes bored to enable wires or pipes to pass through the port. Care must be taken to prevent condensation forming inside the access port

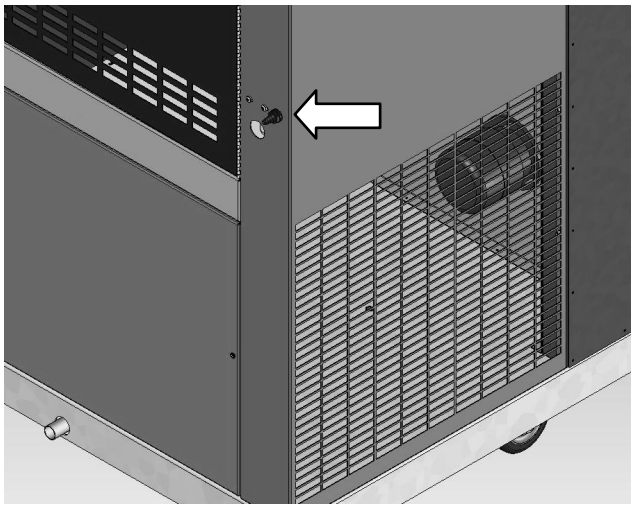
3. NAME AND FUNCTION OF PARTS

Lighting System



3. NAME AND FUNCTION OF PARTS

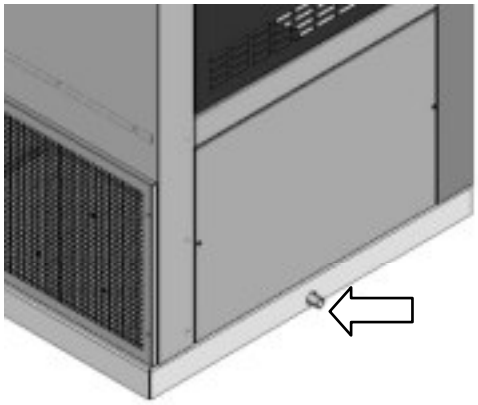
Purified Water Supply



If an AquaRec re-circulation pure water system is provided, please refer to the AquaRec instructions for connection to this unit.

Connect a supply of purified water (see specification page 15) to the inlet pipe situated on the right hand side of the instrument compartment. Maximum allowable head is 1500mm (5ft) above the inlet pipe.

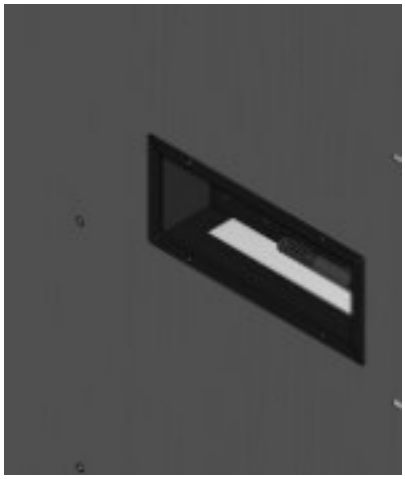
Waster Water Drain



Connect a pipe to the cabinet outlet to give a CONTINUOUS FALL to an OPEN DRAIN. Drainage restriction may cause airlocks and consequently flooding the chamber.

3. NAME AND FUNCTION OF PARTS

Combined temperature/humidity probe



The chamber is fitted with an electronic combined temperature/direct reading humidity probe, used for chamber condition control. The sensor is positioned on the right hand side on the inside of the chamber behind a removable plate

CAUTION:

1. It is important that the probe is not subjected to saturating humidity conditions (i.e. condensing).

2. It is probable that the probe, following a low temperature test, will form a dew point if the chamber door is opened to ambient conditions. This will cause condensation to form on the probe. To prevent this, reset the chamber temperature to the same as ambient but with a low humidity and run the chamber. Only after the probe has attained ambient conditions should the door be opened.

3. The combined temperature/humidity control and monitoring probes are delicate, precision instruments. Only suitably qualified personnel should attempt routine calibration checks in order to avoid damage to probes.

4. BEFORE USE

Safety and Pre-Installation Checks

To ensure the chamber operates correctly please check the following items before using the chamber:

(1) Electrical Supply

Check that the electrical supply available conforms to the information on the power rating plate (found on the side of the chamber above the mains electricity supply cable) and is of sufficient power to run the product.

- Check that the power supply is of the correct phase configuration – either single phase or phase to phase as stated on the chamber rating plate, AC (alternating current) of the stated frequency with neutral nominally at earth potential.
- The supply voltage is within the stated range.
- The current rating is within the capacity of the supply inlet.
- The socket or outlet circuit is suitably fused.

(2) Facility checks

- Check that the purified water supply for the chamber is of sufficient volumetric capacity
- Check that a wastewater ***open*** drain or condense tray is available and is of sufficient capacity
- Check that the Purified water pressure is between 0.1-1.0 Bar (2-14 psi)
- Check that the Purified water has the correct conductivity between 5 - 20µS cm^{-1}.

NOTE:
If the water pressure is higher than 1.0 bar a pressure reducing valve must be fitted in the supply line.
If required Weiss Gallenkamp Limited can supply a pressure reducing valve.

CAUTION: Ultra Pure Water will destroy the heater element and can cause irreparable damage to the plant growth chamber.

(3) Ambient temperature

- **Ambient temperature operating range: + 12ºC to +25ºC**

Check that the room where the chamber is to be installed is adequately ventilated, and ambient conditions do not exceed the specification in terms of temperature and humidity.

(4) Noise emissions

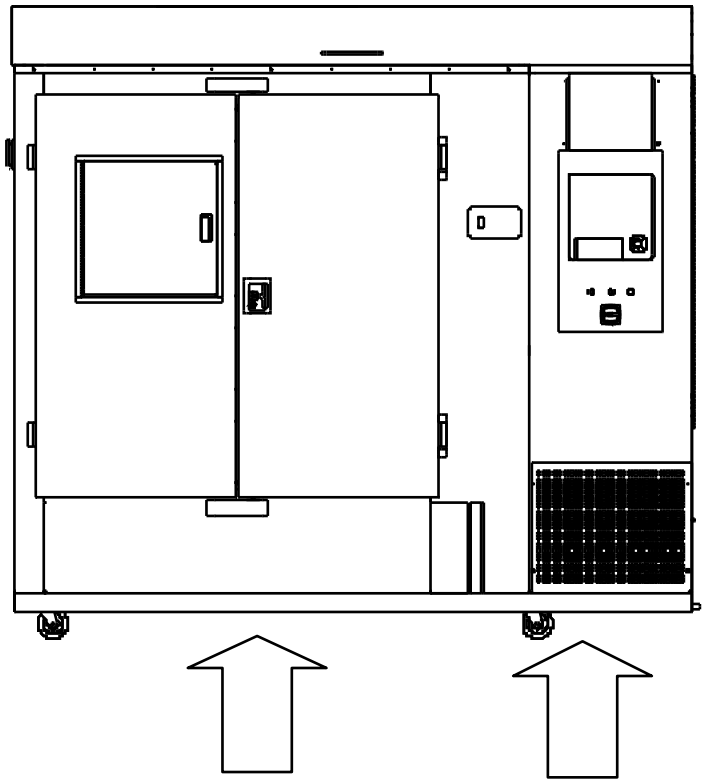
- The sound pressure level emitted by the chamber does not exceed 70dB(A)

(5) Areas for use

- This chamber is ***not*** intended to be used in potentially explosive areas

5. INSTALLATION

Lifting Instructions.

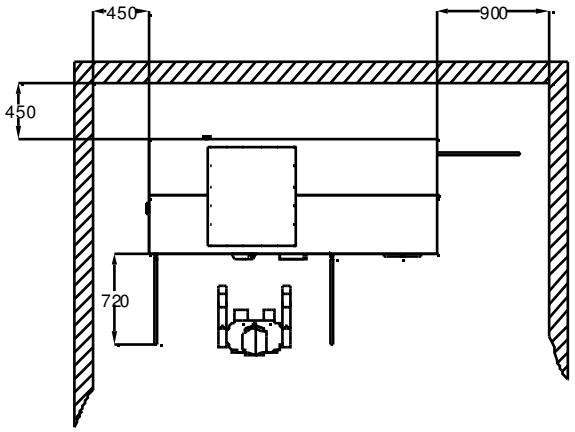


500kg

The chamber should be lifted using a suitable fork lift truck at the positions show. Care should be taken when lifting the chamber not to damage the drain pipe that is positioned on the underside of the chamber.

5. INSTALLATION

Positioning the Chamber



Position the chamber in a ventilated area, on a level stable surface with the following minimum distances from continuous obstructions.

(1) Installation Checks

- If the chamber is sited onto a bench please ensure that the bench is capable of supporting the chamber weight and maximum chamber load combined. (See specification for weights page 53):
- Ensure that the chamber is levelled to +/- 2mm.
- Ensure the chamber is within easy reach of the power supply isolator.
- Ensure open door will not cause an access hazard.

Electrical Power Supply Connection

The chamber should be installed by a competent person to **BS 7671:2000**, or your local wiring regulations.

WARNING: This product must be earthed.

Chambers of higher current requirements are designed to be hard wired to a suitable power outlet by a qualified electrician.

Consult a qualified electrician if in doubt or the supply has any of the following:

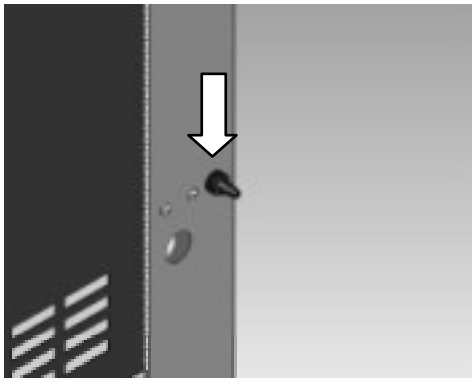
- no earth
- a colour code different from the above
- reversible plugs
- supply and return leads that are both above earth potential
- Machine is connected to a branch circuit that does not have a primary type of overcurrent protection (Since this machine utilises a supplementary type of overcurrent protection.

	415V 50Hz
Green/Yellow	Earth
Black	Live L1
Black	Live L2
Black	Live L3
Blue (2)	Neutral

5. INSTALLATION

Water Connection

Purified water supply connection

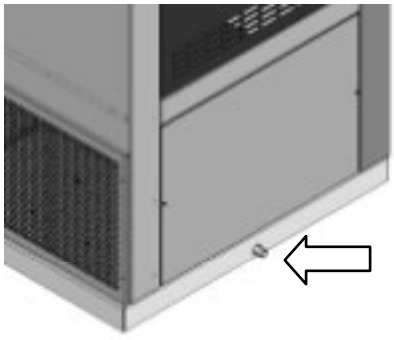


Connect the purified water supply to inlet connector situated on the right side or at the rear of the chamber. Maximum allowable head is 1500mm (4ft 9ins above the inlet pressure). The purified water should have a conductivity range of 5-20µS cm^{-1}, a pressure range of 0.1-1.0bar (2-14Psi)

Ideally any reservoir should have its own support to one side of the chamber.

If the chamber is supplied with an AquaRec, re-circulating pure water system, fill the reservoir as instructed and connect the water connections to the chamber water inlet and drain as shown.

Wastewater drain connection



CAUTION: connect a pipe to give a **CONTINUOUS FALL** to the drain. Drainage restriction can cause an airlock and consequent flooding of the treatment chamber.

The outlet for the wastewater is situated at the rear of the chamber. The connection size is 12.7mm OD. It is important that the connection to the drain has a continuous fall to an open drain

6. PRINCIPLES OF OPERATION

The chamber is split into three different sections, a treatment chamber, growing chamber and the light box

Air is conditioned in the treatment chamber and is constantly recirclated around the growing chamber. The system is designed to give an airflow through the growing chamber with a high tolerance of temperature and humidity, which will allow the user to repeat tests under the same growing conditions. The air velocity through the growing chamber is fast enough to prevent micro climates but slow enough to prevent disturbing the specimen

The growing chamber is separated from the light box via a glass panel, fluorescent lamps are housed inside the lamp box to simulate daylight, incandescent lamps are fitted to supplement the red/far red end of the lighting spectrum.

Temperature

Accurate, repeatable temperature control is achieved by balancing continuous heat extraction with modulated heat control by an electronic PID controller.

Heating

An Inconel sheathed heating elements sited in the treatment chamber. The element operates at black heat for long life and excessive surface temperatures

Cooling

The purpose of providing cooling with the treatment chamber is for the following:
To provide a continuous heat extraction to balance the heating load
To introduce a cold surface on which to control the relative humidity of the chamber

Lighting

The light box houses the fluorescent tubes and incandescent lamps used to simulate daylight. The timing and the intensity of the photoperiods are controlled via the programmer situated on the front of the chamber.

The incandescent lamps can be manually switched or automatically programmed to turn ON of OFF

The fluorescent lamps can be manually switched or automatically programmed to turn ON or OFF and the intensity can be dimmed from 10% to 100% in steps of 1%.

The cooling fans inside the lamp box are switched on automatically when the lights are switched on. The inside walls of the chamber are coated white to minimise light loss and to maximise diffusion.

6. OPERATION

Pre-Operational Checks (Before turning ON)

- The chamber door keys are available to designated users to restrict control and sample access to authorised personnel
- The sample load will not release flammable, noxious or otherwise hazardous vapours
- Avoid using any materials in the chamber that may corrode in the humid atmosphere e.g. mild steel baskets, and also avoid using Chlorine, Iodine or aggressive cleaning agent.
- It is recommended that a chamber log book is kept which details both use, service and calibration history of the chamber
- Users are familiar with the operation of the chamber, including, setting parameters, suitable samples, load distribution, safety aspects, alarms and shut-down procedure as detailed in this manual
- The chamber has been regularly maintained and calibration checked by suitably qualified engineers. It is recommended that the chamber is serviced annually by Weiss Gallenkamp or their approved dealers or service agents
- Standard operating procedures (SOP's) have been prepared and made available to the operators
- Copies of this manual are available to the operator of the chamber

6. OPERATION

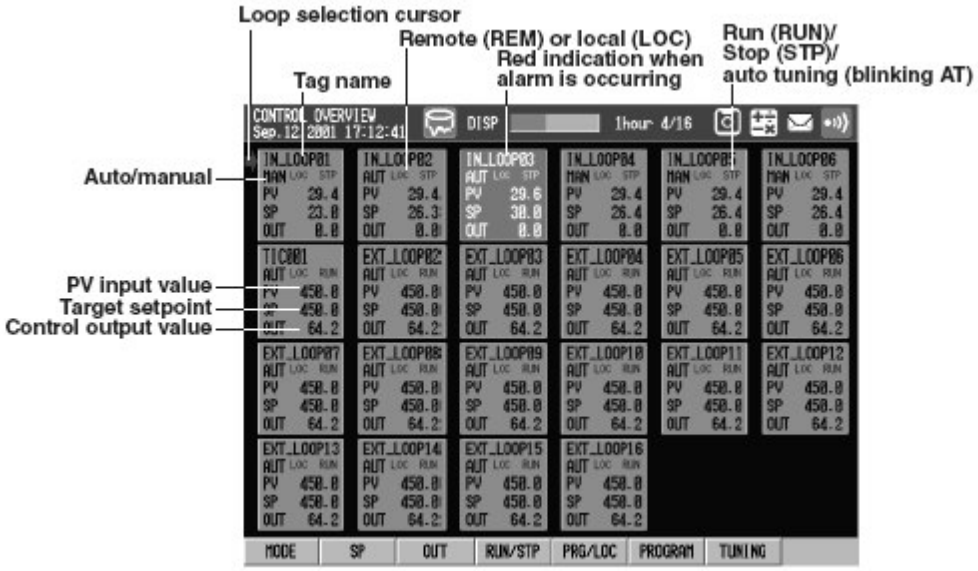
Start Up

1. Switch on the mains power at the mains power connector
2. Switch on the red/yellow mains power isolator
3. Press the Green Mains power switch on the main control panel
4. Power is now available to the controller

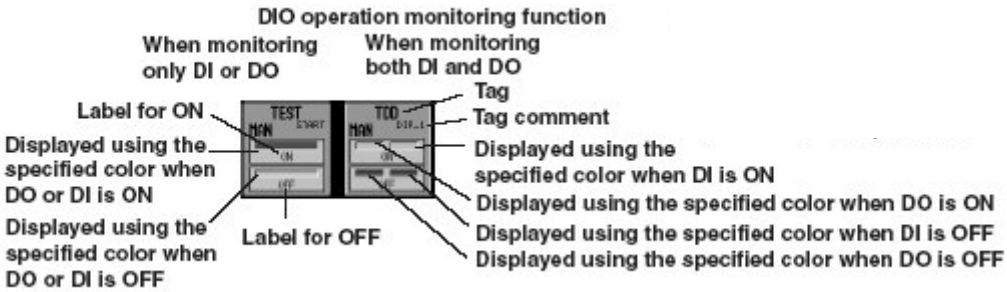
For Steady state control

At the overview screen on the controller, use the cursor keys to move to temperature, humidity or the lighting channels

1. At the desired channel Press soft key [#2] **SP** and use the cursor keys to enter the required setpoint
2. Press **ENTER**
3. Ensure mode (softkey [#1]) is **AUTO**
4. Press soft key [#4] **RUN/STP** and set to **RUN**
5. Repeat for each channel



Ensure that the Fridge switch is set to **ON**



6. OPERATION

To switch on the Fridge, Fluorescent lights or tungsten lights move the cursor to the required switch
Press soft key [#1] Mode and set to Manual

Auto/manual switching window

Press soft key [#2] Out and set to 1 (0 is OFF 1 is ON)

Press the START button and the chamber will start to run and control at the required conditions

For Programmable control

See page 24 to set up a program and page 32 to run a program

Shutdown

When the control is required to be terminated, press the MAINS POWER button. The push button will no longer be illuminated
Turn the red/yellow MAINS ISOLATOR to the OFF position. The chamber temperature will slowly drift to ambient conditions.

Emergency Shutdown

Turn the red/yellow MAINS ISOLATOR to the OFF position and switch off the main power supply to the chamber

6. OPERATION

Automatic Defrost

The chamber is fitted with an automatic defrost system, which is controlled by the CX2000 controller. The defrost control switch can be seen on the overview screen along with the evaporator coil temperature. The defrost switch should always be left in the auto position so defrost period can determined on demand by the controller.

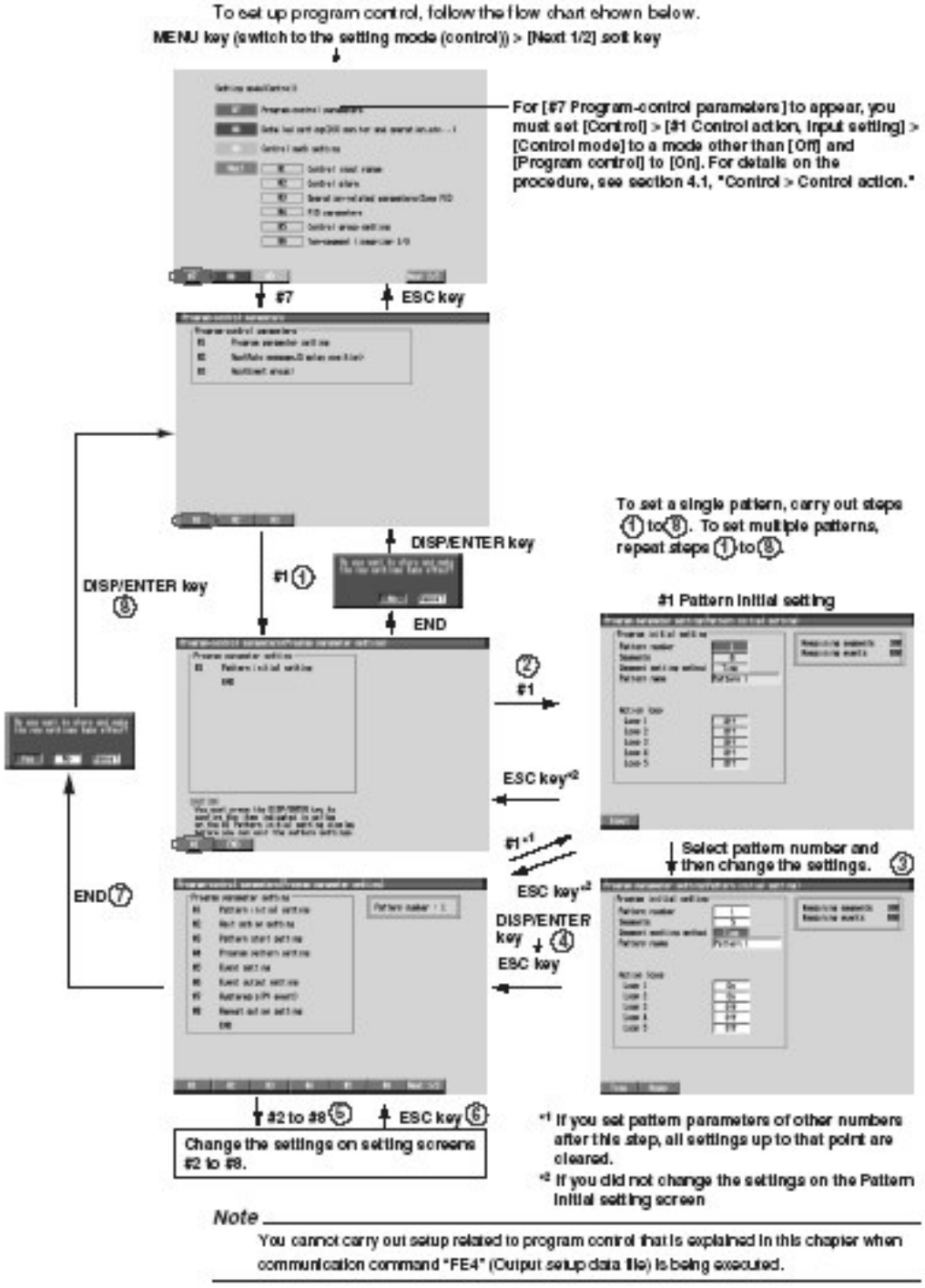
The purpose of the defrost system is to allow ice on the evaporator to melt. Both the frequency and the length of the defrost period is automatically controlled.

The rate of build up of ice and hence the need for defrosting is determined by the automatic defrost system, by switching the refrigeration unit off, this will occur providing the evaporator coil has been below +2ºC for over an hour. Once the evaporator coil temperature rises above +2ºC the refrigeration system will switch back on. The system will not defrost again until the evaporator coil has been below 2ºC for another hour.

6. OPERATION - PROGRAMMING

Programming – Via the Controller

Program Control Setup Procedure



Note

You cannot carry out setup related to program control that is explained in this chapter when communication command "FE4" (Output setup data file) is being executed.

6. OPERATION - PROGRAMMING

Pattern Initial Setting

Opening the Settings Display

Press the keys in the following sequence:
MENU key (switch to the setting mode (control)) > #7 soft key (select [program-control parameters]) > #1 soft key (select [program parameter setting]) > #1 soft key (select [pattern initial setting])

Setup Procedure

Use the arrow keys to move the cursor (blue) to the item box you wish to change. A soft key is displayed at the bottom of the screen

1. Press the soft key corresponding to the value you wish to select. The box for the item you changed turns yellow, and the cursor moves to the next item
2. Repeat steps 1 and 2 to change the value of all the terms you wish to change
3. Press the DISP/ENTER key to confirm the changes. The box for the items that have been changed turn from yellow to white, and the cursor returns to the first item
4. Press the ESC key to return to the [program parameter setting] menu. To continue with the program setting, press the [#1] to [#6] soft keys to display each setting display without carrying out step 6
5. Press the [End] soft key – A window appears for confirmation to save the new settings.
6. Select [Yes] and press the DISP/ENTER key and save the settings.

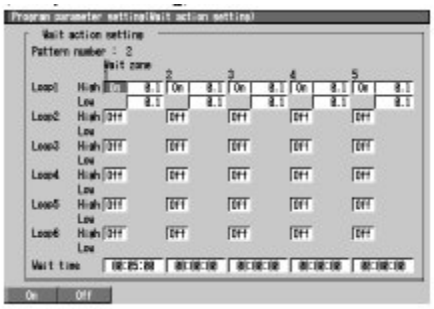
Note: Loop 1 – Temperature
Loop 2 – Humidity
Loop 3 – Fluorescent Lights

6. OPERATION - PROGRAMMING

Wait action setting

Opening the setting display

Press the keys in the following sequence:
MENU key (switch to the setting mode (control)) > #7 soft key (select [program-control parameters]) > #1 soft key (select [program parameter setting]) > #1soft key (select [pattern initial setting])



Setup Procedure

1. Use the arrow keys to move the cursor (blue) to the item that needs to be changed. A soft key menu is displayed at the bottom of the display.
2. Press the soft key corresponding to the value you wish to select. The box for the item you change turns yellow, and the cursor moves to the next item
3. Repeat steps 1 and 2 to change the value of all the terms you wish to change
4. Press the DISP/ENTER key to confirm the changes. The box for the items that have been changed turn from yellow to white, and the cursor returns to the first item.

Setup Items

Wait zone off/on

Turn off/on the wait zone for each loop

Wait zone values

Set the wait zones in the range of 0 to 100% of the measurement span

Wait Time

Set the wait time in [hh:mm:ss] format for each available zone. The setting applies to the same zone in each loop.

Pattern Start setting

Opening the Setting Display

Press the keys in the following sequence:
MENU key (switch to the setting mode (control)) > #7 soft key (select [program-control parameters]) > #1 soft key (select [program parameter setting]) > #1 soft key (select [pattern initial setting])

Setup Procedure

1. Use the arrow keys to move the cursor (blue) to the item that needs to be changed. A soft key menu is displayed at the bottom of the display.
2. Press the soft key corresponding to the value you wish to select. The box for the item you change turns yellow, and the cursor moves to the next item
3. Repeat steps 1 and 2 to change the value of all the terms you wish to change
4. Press the DISP/ENTER key to confirm the changes. The box for the items that have been changed turn from yellow to white, and the cursor returns to the first item.

Pattern Start Setting

Pattern Number – Displays the pattern number selected in the pattern initial settings
Start target setpoint – Set the SP, for each loop

6. OPERATION - PROGRAMMING

Program Pattern Setting

Opening the Setting Display

Press the keys in the following sequence:
MENU key (switch to the setting mode (control)) > #7 soft key (select [program-control parameters]) > #1 soft key (select [program parameter setting]) > #1soft key (select [pattern initial setting])

Setup Procedure

1. Use the arrow keys to move the cursor (blue) to the item that needs to be changed. A soft key menu is displayed at the bottom of the display.
2. Press the soft key corresponding to the value you wish to select. The box for the item you change turns yellow, and the cursor moves to the next item
3. Repeat steps 1 and 2 to change the value of all the terms you wish to change
4. Press the DISP/ENTER key to confirm the changes. The box for the items that have been changed turn from yellow to white, and the cursor returns to the first item.

Setup Items

Pattern Number

Displays the pattern number selected in the pattern initial settings

Segment number

Select the number of the segment to be changed from 1 to 99

Ramp/Soak select

Select the type to be specified ([Ramp] or [Soak])

Target Setpoint

Set the final SP of the ramp segment for each loop

Segment time

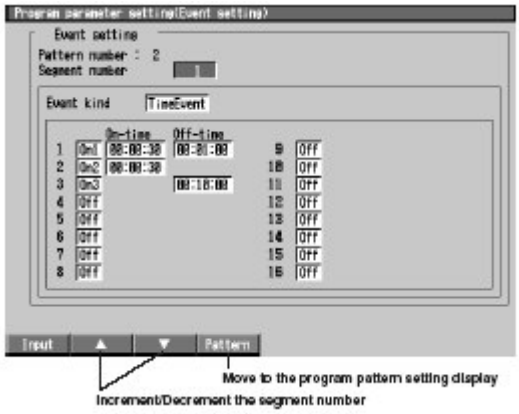
Set the segment time in [hh:mm:ss] format.

6. OPERATION - PROGRAMMING

Event Setting

Opening the Setting Display

Press the keys in the following sequence:
MENU key (switch to the setting mode (control)) > #7 soft key (select [program-control parameters]) > #1 soft key (select [program parameter setting]) > #1 soft key (select [pattern initial setting])



Setup Procedure

1. Use the arrow keys to move the cursor (blue) to the item that needs to be changed. A soft key menu is displayed at the bottom of the display.
2. Press the soft key corresponding to the value you wish to select. The box for the item you change turns yellow, and the cursor moves to the next item
3. Repeat steps 1 and 2 to change the value of all the terms you wish to change
4. Press the DISP/ENTER key to confirm the changes. The box for the items that have been changed turn from yellow to white, and the cursor returns to the first item.

Event Setting

Pattern Number

Displays the pattern number selected in the pattern initial settings

Segment number

Select the number of the segment to be changed from 1 to 99

Event Kind

Select the [TimeEvent]

On1/On2/On3/Off

Set the On/Off setting type for each event from the following. Select [Off] for vents that are not to be assigned.
On1 (On/Off) Use On time and Off time
On2 (On/**) Use On time only
On3 (**/Off) Use off time only

On-time/Off time

Set the on time/Off time of the time event in hh:mm:ss format. The selectable range is 00:00:00 to 99:59:59. Set Off time ≥ On time

Timed events are used to switch on and off the lights

1) SW001 – Fridge
2) SW002 – Defrost **
3) SW003 - Fluorescent Lights
4) SW004 – Tungsten Lights
** Always leave the defrost set to Off, and set to auto on the overview screen to ensure defrost on demand.

Repeat Action

Opening the Setting Display

Press the keys in the following sequence:
MENU key (switch to the setting mode (control)) > #7 soft key (select [program-control parameters]) > #1 soft key (select [program parameter setting]) > #1 soft key (select [pattern initial setting])

Setup Procedure

1. Use the arrow keys to move the cursor (blue) to the item that needs to be changed. A soft key menu is displayed at the bottom of the display.
2. Press the soft key corresponding to the value you wish to select. The box for the item you change turns yellow, and the cursor moves to the next item
3. Repeat steps 1 and 2 to change the value of all the terms you wish to change
4. Press the DISP/ENTER key to confirm the changes. The box for the items that have been changed turn from yellow to white, and the cursor returns to the first item.

Setup Items

Pattern Number

Displays the pattern number selected in the pattern initial settings

Repeat Action

Select the repeat function from [Off], [On] and [Repeat]

Repeat Frequency

Set the number of repetitions when the repeat function is turned ON in the range of [1] to [999]

Repeat start segment/Repeat end segment

Set the repeat start segment number and the repeat end segment number when the repeat function is turned ON or when the repeating in the range of 1 to 99.

For more information please refer to the CX2000 User's Manual

6. OPERATION - PROGRAMMING

Programming – Via DAQSTANDARD

If the CX2000 is connected to a network then the controller can be programmed using the DAQSTANDARD software. Once the program has been written it can be downloaded to the controller. A maximum of four programs can be stored at once. **For more information please see the DAQSTANDARD manual included with the chamber**

Programming Information

Set points

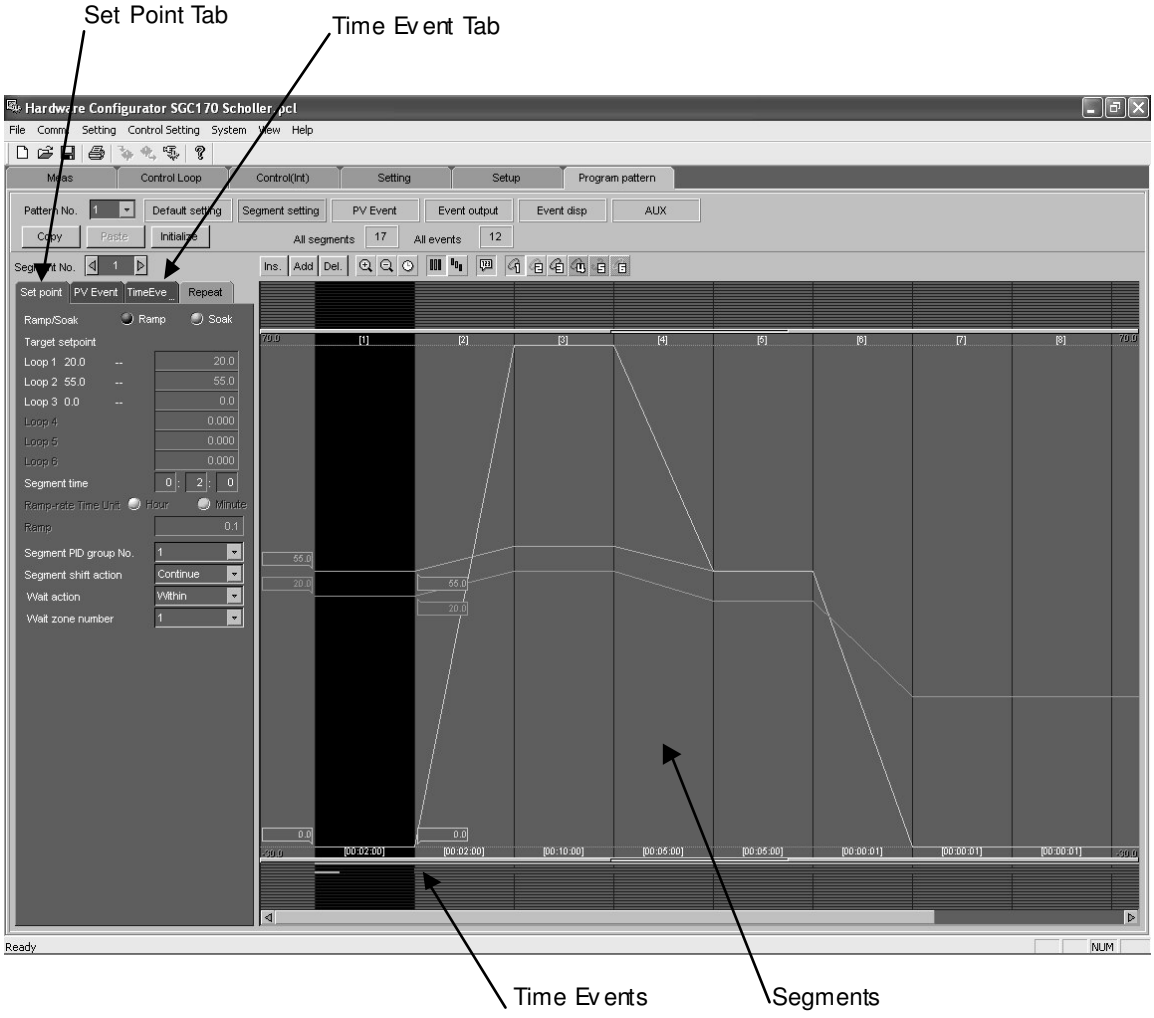
Loop 1 – Temperature
Loop 2 – Humidity
Loop 3 – Fluorescent Lighting

Timed Event

Timed events are used to switch on and off the lights

1) SW001 – Fridge*
2) SW002 – Defrost **
3) SW003 - Fluorescent Lights
4) SW004 – Tungsten Lights

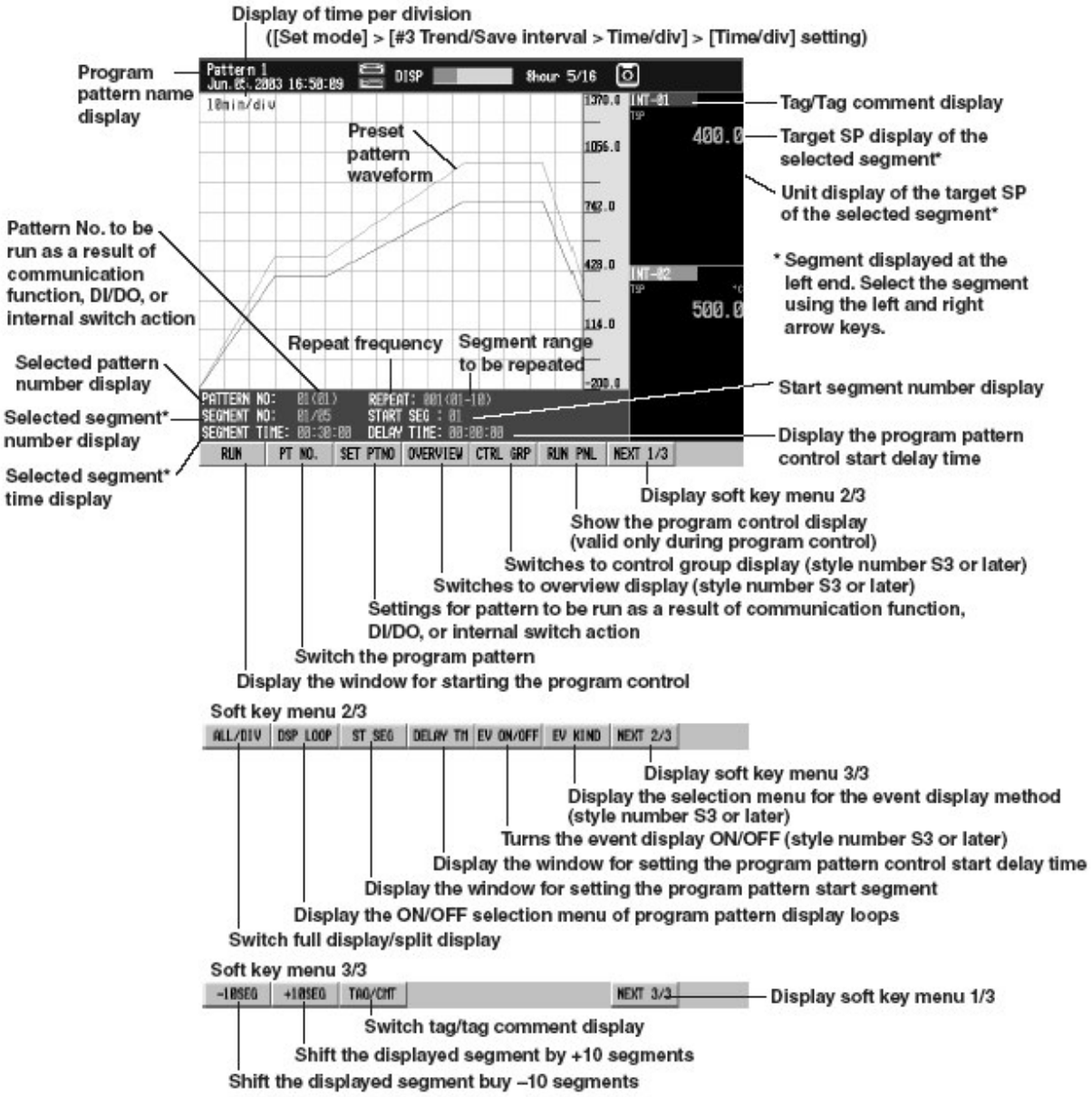
* Always ensure that SW001 – Fridge is turned on
** Always leave the defrost set to Off, and set to auto on the overview screen to ensure automatic defrost on demand



6. OPERATION - PROGRAMMING

Program Operation

Displayed Information and Operations on the Program Selection Display



Switching the Pattern Number

1. Press the **[PT NO.] soft key.**
   A pop-up window for switching the pattern number appears. The window shows the current pattern number.

2. Select the pattern number using the up and down arrow keys.
3. Press the **DISP/ENTER** key to confirm the changes.
   To close the window without making any changes, press the ESC key.

Setting Operation for Patterns That Start by Communications Command, DI/DO, or Internal Switches (Style Number S3 Or Later)

1. Press the **[SET PTNO.] soft key.**
   The pattern number (the same number as the pattern number that can be started from this screen) selected by the PT NO. soft key above is set.
   Even if you change the pattern number with the PT NO. soft key, if you do not press the SET PTNO soft key, the pattern numbers that start by communication commands, DI/DO/internal switches are not changed.

Switching to the Overview Screen (Style Number S3 or Later)

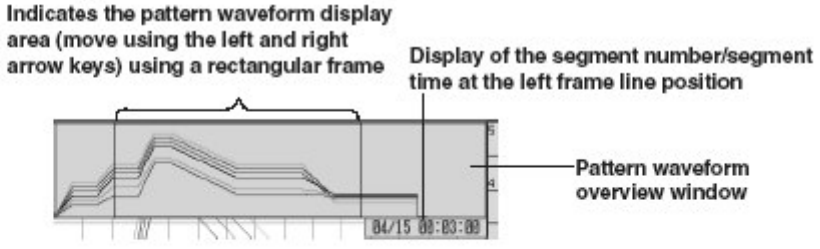
1. Press the **[OVERVIEW] soft key.**
   Among the loops of the displayed program patterns, the screen switches to the overview screen including loops with small numbers.

Switching to the Control Group Screen (Style Number S3 or Later)

1. Press the **[CNTRL GRP] soft key.**
   Among the loops of the displayed program patterns, the screen switches to the group's control group screen including loops with small numbers.

Selecting Segments

- Press the **left and right arrow keys.**
  The displayed pattern waveform shifts horizontally by one segment. The [SEGMENT NO], [SEGMENT TIME], and the target SPs of each group corresponding to the segment shown at the left end are displayed.
- To shift 10 segments at a time, press the **[+10SEG]** or **[-10SEG] soft key.**
- Press the **up arrow key** to show the pattern waveform overview window as shown in the figure below. You can select segments (as described above) while showing this pattern waveform overview window. To close the pattern waveform overview window, press the **down arrow key.**



Turning ON/OFF the Pattern Waveform Display of Each Loop

1. Press the [DSP LOOP] soft key.
   A menu used to turn ON/OFF the pattern waveform display appears. The soft keys of each loop show the tag names of each loop ([INT-01] to [INT-06] in the figure below).

2. Press the soft key corresponding to the tag name of the loop you wish to turn ON/OFF.

3. Select [ON] or [OFF] using the **up and down arrow keys**.
4. Press the **DISP/ENTER key** to confirm the changes.
   To close the window without making any changes, press the ESC key.
   Press the [BACK] soft key to return to the original soft key menu.

Starting Program Control

1. Press the **[RUN] soft key**.
   A pop-up window for starting the program control appears.

2. Press the **DISP/ENTER key**.

Selecting the Program Pattern Start Segment

1. Press the **[NEXT 1/3] soft key**.
2. Press the **[ST SEG] soft key**.
   A pop-up window for selecting the start segment appears.

3. Select the segment number using the **up and down arrow keys**.
4. Press the **DISP/ENTER key**.

Setting the Delay Time for Starting the Program Pattern Control

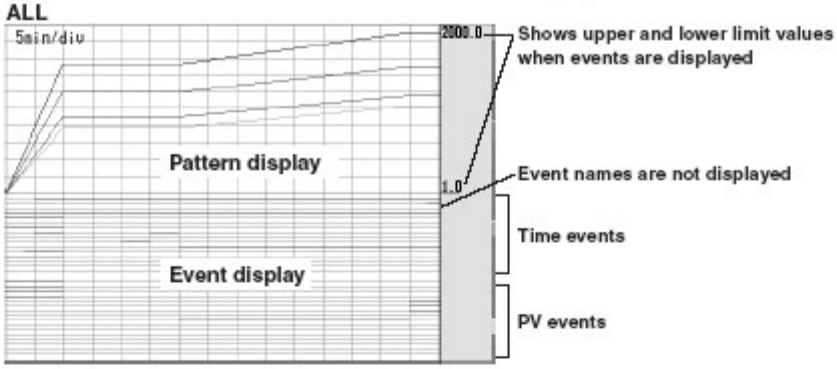
1. Press the **[NEXT 1/3] soft key**.
2. Press the **[DELAY TM] soft key**.
   A pop-up window for setting the delay time appears.

3. Change the delay time using the **up and down arrow keys**.
4. Press the **DISP/ENTER key**.

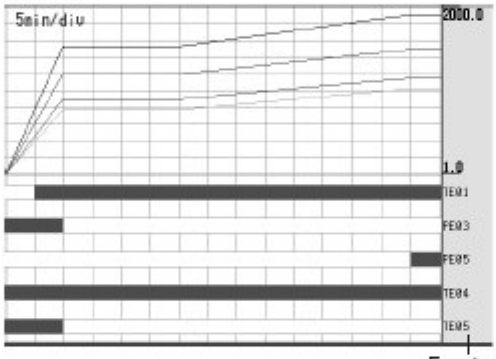
Event Display Operation (Style Number S3 or Later)

1. Press the [Next 1/3] soft key.
2. Press the [EV ON/OFF] soft key.
   Time events and PV events are displayed.

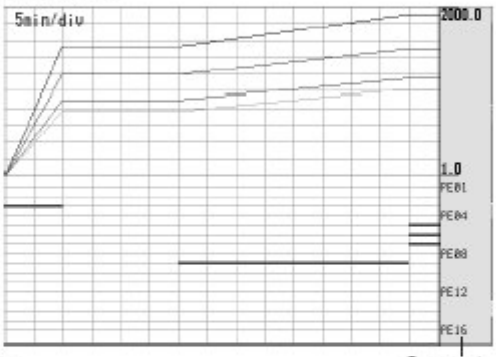
ALL



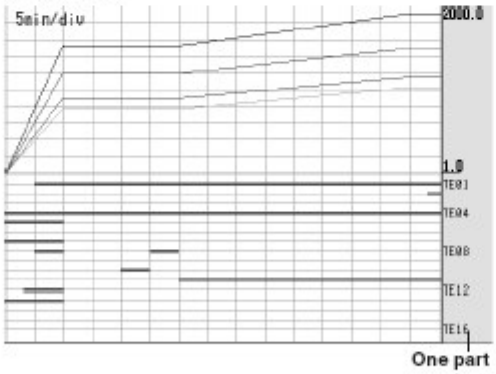
GROUP



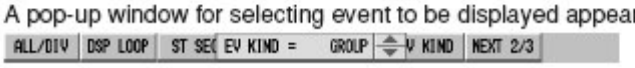
PV events



Time events

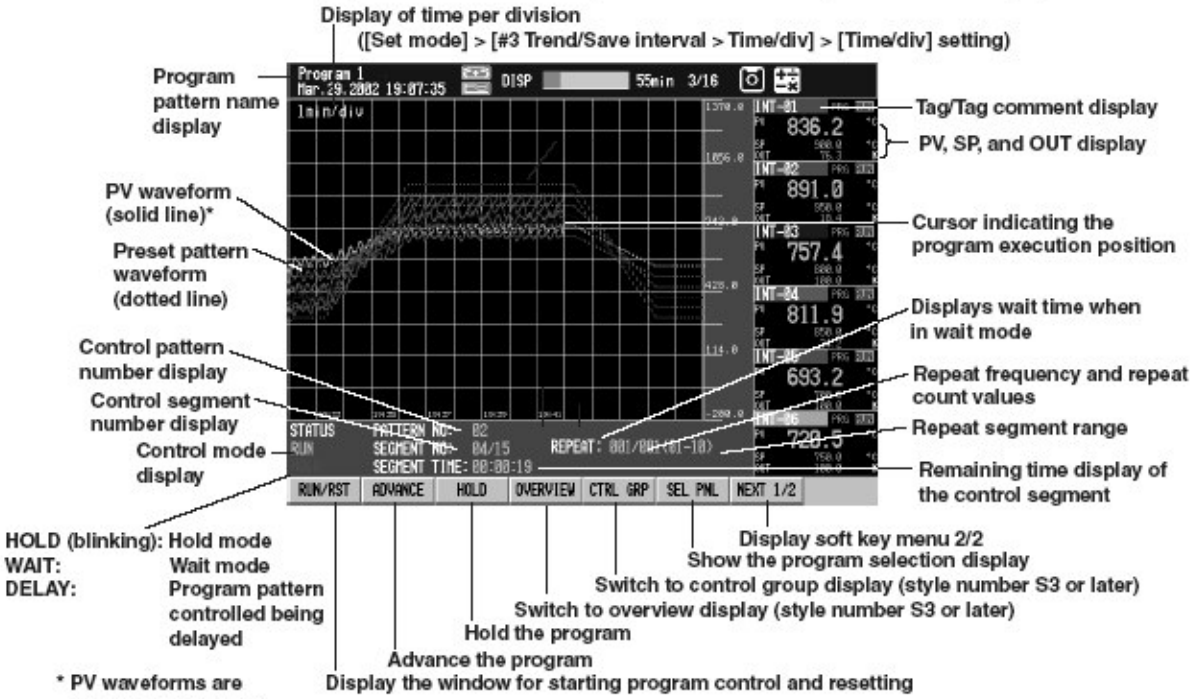


3. Press the [EV KIND] soft key.
   A pop-up window for selecting event to be displayed appears.

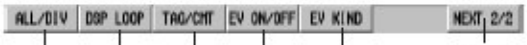


4. Set the events to be displayed using the up and down arrow keys.
5. Press the DISP/ENTER key.

Displayed Information and Operations on the Program Control Display

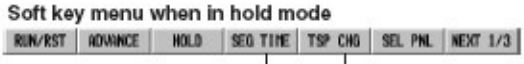


Soft key menu 2/2

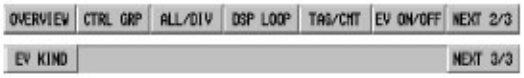


Display soft key menu 1/2
Display the selection menu for the event display method (style number S3 or later)
Turn the event display ON/OFF(style number S3 or later)
Switch tag/tag comment display
Display the ON/OFF selection menu of program pattern display loops
Switch full display/split display

Soft key menu when in hold mode



Display the menu for selecting the loop of which the target SP is to be changed
Display the window for changing the remaining segment time



Running and Resetting Program Control

1. Press the [RUN/RST] soft key.
   A pop-up window for running and resetting the program control appears.
2. Select [RUN] or [RESET] using the up and down arrow keys.
3. Press the DISP/ENTER key to confirm the changes.
   To close the window without making any changes, press the ESC key.

Advancing Segments

1. Press the [ADVANCE] soft key.
   A pop-up window for advancing segments appears.

2. Press the DISP/ENTER key to execute the advance operation.
   To cancel the operation, press the ESC key.

Executing and Releasing the Hold Operation

1. Press the **[HOLD] soft key**.
   A pop-up window for executing/releasing the hold operation appears.

2. Select [ON] (execute) or [OFF] (release) using the **up and down arrow keys**.
3. Press the **DISP/ENTER key** to confirm the changes.
   To close the window without making any changes, press the ESC key.

Changing the Remaining Segment Time When in Hold Operation

1. Press the **[SEG TIME] soft key**.
   A pop-up window for changing the remaining segment time appears. The window shows the remaining segment time.

2. Change the remaining segment time using the **up and down arrow keys**.
3. Press the **DISP/ENTER key** to confirm the changes.
   To close the window without making any changes, press the ESC key.

Changing the Target SP When in Hold Operation

1. Press the **[TSP CHG] soft key**.
   A menu for selecting the loop of which the target SP is to be changed appears. The soft keys of each loop show the tag names of each loop ([INT-01] to [INT-06] in the figure below).

2. Press the **soft key** corresponding to the tag name of the loop you wish to change the target SP.
   A pop-up window for changing the target SP appears. The window shows the current target SP.

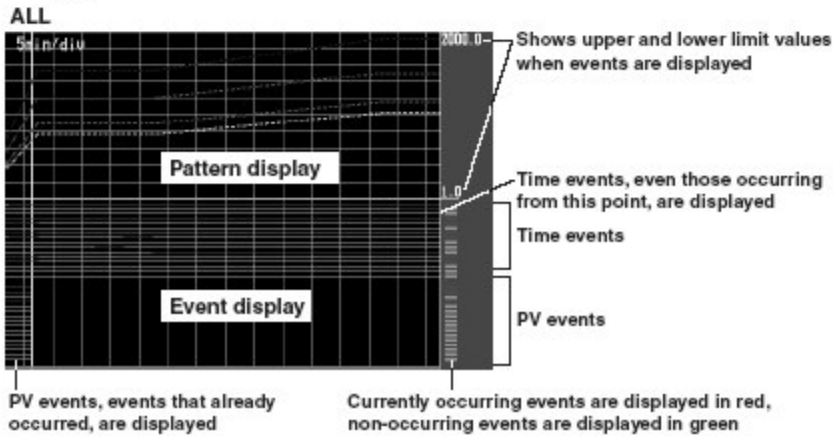
3. Change the target SP using the **up and down arrow keys**.
4. Press the **DISP/ENTER key** to confirm the changes.
   To close the window without making any changes, press the ESC key.
   Press the [BACK] soft key to return to the original soft key menu.

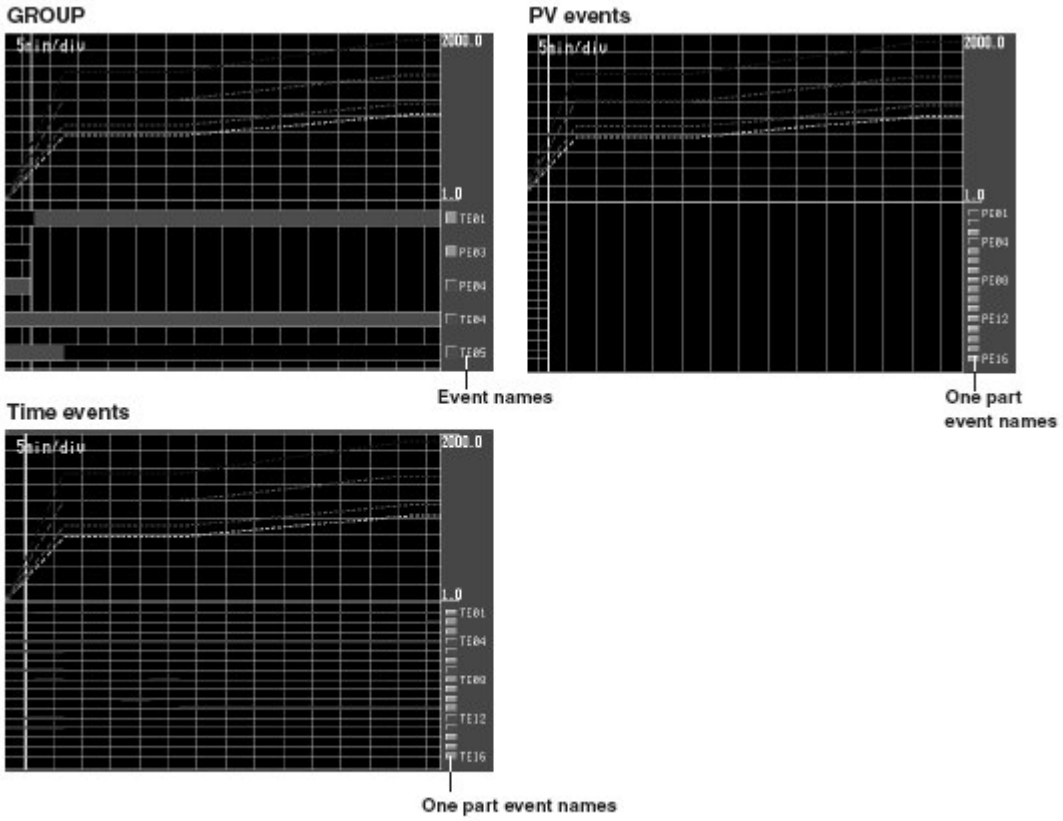
Turning ON/OFF the Pattern Waveform Display of Each Loop

The operation is the same as program selection display. For the operating procedure, see page *6-12*.

Event Display Operation (Style Number S3 or Later)

The operation is the same as program selection display. For the operating procedure, see page *6-13*.





Executing Several Program Patterns

You can execute multiple program patterns whose loop numbers do not overlap.

Switching Pattern Numbers (see page 6-13)

1. Press the **[PT NO.] soft key** in the program selection screen.
   The pattern number switching pop-up window appears. The currently set pattern numbers are displayed in the window.
2. Select a pattern number using the **up and down arrow keys**.
3. Press **DISP/ENTER key** to confirm the changed settings.
   To close without saving, press the ESC key.

Program Operation Start

1. Press the **[RUN] soft key**.
   The program operation start pop-up window appears.
2. Press the **DISP/ENTER key**. The screen changes to the program operation display.

Displaying the Program Selection Display

1. Press the **[SEL PNL] soft key**.
   The screen changes to the program selection display.

Executing a Separate Program Pattern

1. Repeat the above procedure as necessary.

Switching the Displayed Pattern in the Program Operation Display

1. Press the **left or right arrow keys** to switch the displayed pattern.

Switching from the Screen Selection Menu

1. Press **DISP/ENTER key** in the program operation display to display the display selection menu.
2. With Control selected, press the **Right arrow key** to display a submenu.
3. Press the **up and down arrow keys** to select the pattern to display.
4. Press the **DISP/ENTER key** to display the selected pattern.

Starting Program Control

Start program control by displaying the program selection display, selecting the pattern number ([PT NO.] soft key), and starting the control ([RUN] soft key). You can only start the program control on the program selection display.
When you start the program control, the program selection display switches to the program control display. On the program control display, run and reset the program control using a pop-up window that appears by pressing the [RUN/RESET] soft key.

Selecting the Program Pattern Start Segment

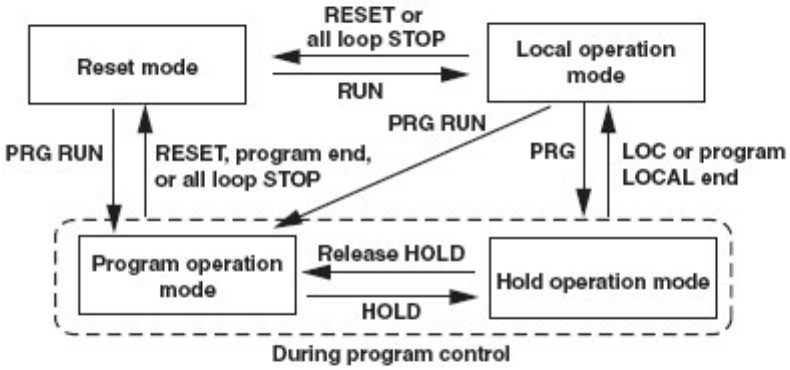
If you wish to set the program control start segment to a value other than [1], select the start segment number using a number within [Segments]. Set the value on the program selection display before program control. The value is reset to [1] when you reset the program control.

Setting the Delay Time for Starting the Program Pattern Control

If you wish to delay the starting of the program pattern control by a specified time, set the time from program control start to program pattern control in the range of [00:00:00] to [99:59:59]. Set the value on the program selection display before program control. The value is reset to [00:00:00] when you reset the program control.

Operation Mode during Program Control

The following operation modes are available during program control. Of the operations shown in the figure below, [RUN/STOP] and [PRG/LOG] switch operations are carried out on the control group display. For these operations, see *section 6.1, "Operations on the Control Group Display (Switching Displayed Information and Control Operation Modes)."*



In the figure, "reset mode" refers to the status in which the program control of all loops is stopped. When program control is started, all loops enter "program control mode." When in "reset mode," you cannot set specified loops to "program control mode." However, you can switch specified loops to "local mode" or stop the operation after program control is started. In addition, even when certain loops are in "local mode," the operation of all loops stops when you set "reset mode."

Display Update Rate on the Program Control Display

The update rate of the waveform section follows the settings specified by [Set mode] > [#3 Trend/Save interval, Message, File, USER key, DST] > [Time/div]. The update rate of other information is 1 s.

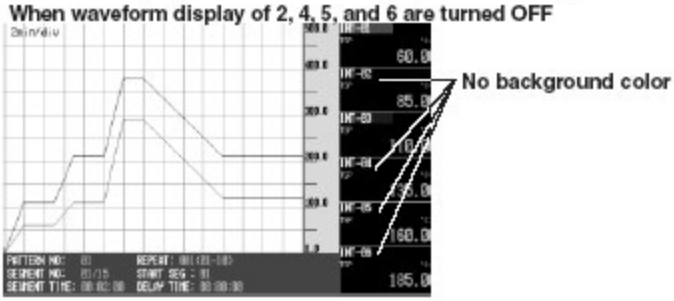
Displayed Preset Pattern Waveforms and Their Display Color

Only the preset pattern waveforms of loops that are set as follows are displayed: [Control] > [#1 Control action, Input setting] > [Control mode] to a mode other than [Off] and [Program control] to [On]. If cascade control loops are present, the secondary loops are not displayed. The pattern waveform colors are red, green, blue, blue-violet, brown, and orange for loops 1 to 6, respectively.

Turning ON/OFF Preset Patterns and PV Waveforms

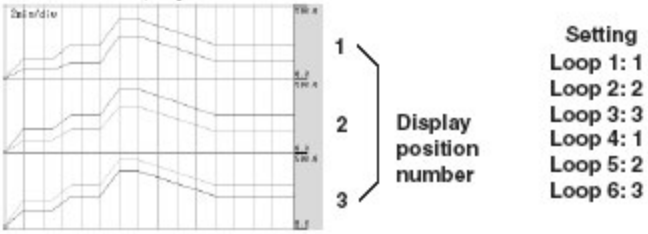
If viewing is difficult due to overlapping waveforms or if you wish to monitor only certain loops, you can turn OFF the display of unneeded waveforms. For loops of which the waveform display is turned OFF, the background color (waveform color) of the tag/tag comment display in the numeric display section disappears.

When waveform display of 2, 4, 5, and 6 are turned OFF



Split Waveform Display on the Program Selection Display and Program Control Display

If viewing is difficult due to overlapping waveforms on the full display, you can divide the display area into sections. The waveform display position of each loop in split display is set using [setting mode (control)] > [#7 Program-control parameters] > [#3 AUX (Auto message, Display position)] > [Program display position]. For the procedure, see *section 5.9, "AUX (Auto message, Display position)."* The figure below shows an example in which the display area is divided into three sections.



Note

The scale displayed at the right edge of the waveform display section on the full display is the scale corresponding to the smallest numbered loop. On the split display, the scale is that of the smallest numbered loop in the divided area.

Changing the Pattern Settings When in Hold Operation

You can change the following settings when in hold operation.

- The remaining time of the current segment
- Target SPs of each loop

When in hold operation, the soft key menu shows [SEG TIME] (display a window for changing the remaining segment time) and [TSP CHG] (display a menu for selecting the loop of which the target SP is to be changed).

Behavior of the Cursor Indicating the Program Execution Position

- Before program control is started, the cursor is at the left end of the waveform display section.
- After program control is started, the cursor moves to the right and indicates the program execution position.
  PV waveforms are not displayed until you press the START key to start the data acquisition to the internal memory.
- After the cursor moves near the center of the waveform display section, the cursor display position stops and the waveforms move. This is to display both the past and future sections of the waveforms.
- When the pattern end is neared, the cursor moves to the right.
- When the pattern ends, the cursor is at the right end of the waveform display section.

Display When in Hold/Wait Operation and When Released

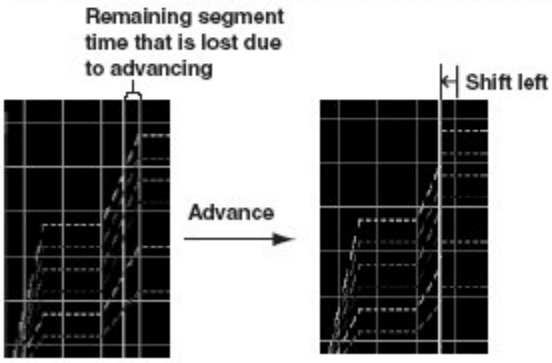
- When program control is in hold or in wait status, segment time stops and the preset pattern waveform no longer moves. However, PVs continue to be updated.
- When program control hold or wait is released, waveforms are redrawn for the past section based on the PVs and SPs. For the future section, waveforms are redrawn based on the pattern settings. If the pattern is changed while program operation is held, the corresponding preset pattern is redrawn.

Event Display (Style Number S3 or Later)

- The screen splits into the program selection and program operation displays, and displays events. You can select an event display method from the following.
  GROUP: The 5 events and event names specified for the group are displayed.
  TIME EV: All time events and representative event names are displayed.
  PV EVENT: All PV events and representative event names are displayed.
  ALL: All events are displayed
- In the program operation display, time events scheduled from the current time are displayed.
- In the program operation display, the indicators that show whether events are ON or OFF are displayed.
  ON: Displays in red
  OFF: Displays in green
- When displaying events, waveform division display is unavailable.
- Shows upper and lower limit scale values only when events are displayed

Display during Advance

When the [ADVANCE] soft key is pressed, the remaining segment time is cleared, and the program moves to the beginning of the next segment. Accordingly, the future section of the displayed preset pattern is shifted by an amount of the lost remaining segment time.



Executing Multiple Program Patterns

You can run a program pattern when another program pattern is running. Patterns having overlapping loops may not be run simultaneously.

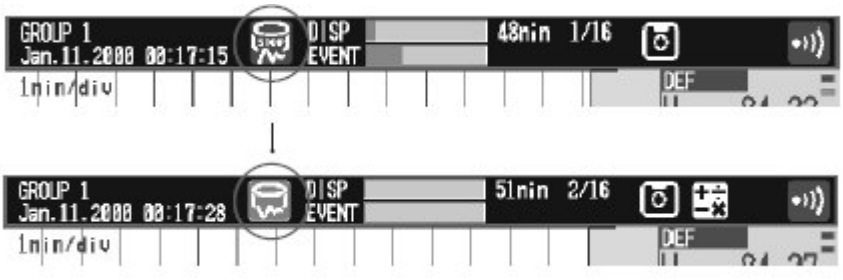
6. OPERATION – DATA ACQUISTION

Data Acquisition – Internal Memory

Starting Data Acquisition to the Internal Memory.

Press the **START** button.

When the data acquisition to the internal memory starts, the memory operation indicator icon changes from stop indication to run indication as shown below.



Stopping Data Acquisition to the Internal Memory.

Press the **STOP** button
Use the left and right arrow keys to select [Memory] of [Mem+Math] in the confirmation window that appears

Press **DISP/ENTER** key. When the data acquisition to the internal memory stops, the memory operation indicator icon changes from run to stop indication.

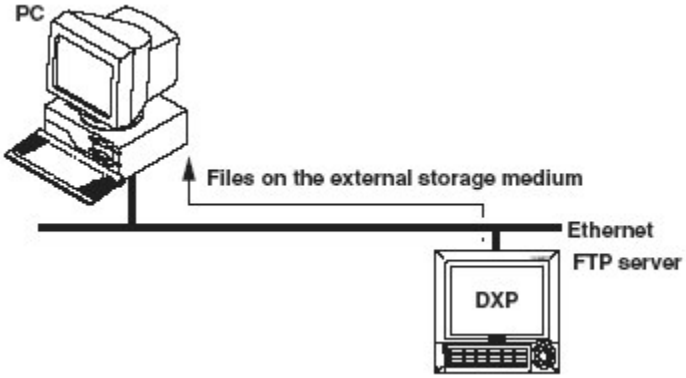
6. OPERATION – COMMUNICATION FUNCTION

By using the Ethernet interface that is fitted to the controller data can be transferred on to a server in two methods:

1. FTP Server

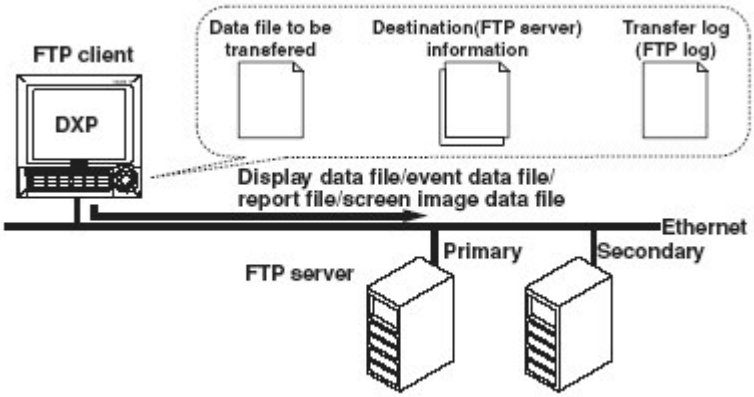
The controller can be accessed from a PC to retrieve files from the external storage device

2. FTP Client – Automatic File Transfer



The display data file, event data file, and the report file can be automatically transferred to a remote FTP server, The result of the transfer is confirmed on the FTP log screen.

Up to two files destinations can be specified (primary and secondary). If the primary server is down, the file is transferred to the secondary file.



6. OPERATION – COMMUNICATION FUNCTION

Web Server

The controller screen can be displayed on the browser applications of Microsoft Internet Explorer. Two screens are available. The screen can be updated at a constant period.

1. Monitor Page

Screen for dedicated for monitoring. The following information can be displayed.

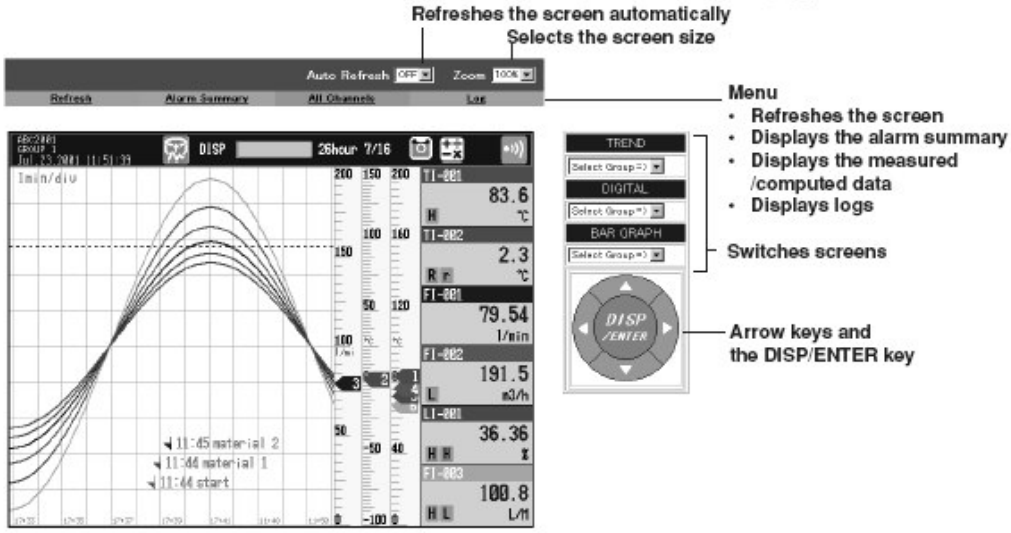
- Alarm Summary
- Measured/computed data of all channels
- Logs (Message summary, error log, FTP log, email log, Web operation log, setting change log)

2. Operator Page

In addition to the contents on the monitor page the controller screen can be switched to different views.

Access Control

You can set access control (user name and password) on each page.



Email Transmission

The controller can transmit emails to specified destinations at the following times:

- When an alarm is active/released
- During recovery from a power failure
- When memory end is detected
- When an error related to the external storage medium and FTP client occurs

For more information on the controller communication functions and setup please refer to the communication manual included with the chamber

7. MAINTENANCE

Preventive Maintenance.

All maintenance and servicing should only be carried out by suitably trained and qualified personnel.

The cabinet has been designed and built for a long life and required minimal attention and maintenance. However, regular attention to the few points few points will ensure a long and trouble free operation.

If the cabinet does fail, the expertise of our service engineers is readily available for either diagnostic advice or non-site attendance. Service and calibration contracts are available from our service department.

Weekly or post test if longer.

Cleaning. Do not use cleaning agents that contain 'hypochlorite' as these may attack stainless steel.
Check Drain Accumulation of contaminants from the test samples can block the treatment chamber drain. To inspect the drain, remove the two screws holding the treatment chamber cover and remove the panel. The drain in the base should be free from contaminants that could block it.

Monthly.

Check Thermostat.
Adjust the thermostat through the prevailing cabinet temperature. Check for the correct function. In the event of the thermostat being faulty Rectify the fault at once. The thermostat should switch the chamber OFF

Purified Water Inlet.
The filter inside the clear plastic bowl is located inside the instrument compartment, after the water inlet nozzle, this can be inspected by looking through the viewing hole. The clear plastic bowl and filter can be unscrewed and removed for cleaning.
To clean the filter (see page 43), disconnect the water supply, open the instrument compartment door, unscrew the filter bowl and remove the filter. Clean or replace the filter and clean the bowl. Reassemble in reverse order. Care must be exercised so that water is not splashed onto other areas in the instrument compartment.

Float Valve.
The float valve maintains the level of purified water for the vapour phase generator. The float valve, in the chamber should be checked for correct operation. Open the instrument door, remove the loose lid from the constant level device

Refrigeration Unit Cleaning.
Switch off the mains power supply, remove the ventilation panels, gently brush/blow/vacuum dust etc from the fins and tubes of the condenser coils

Annually.

Checking of the calibration, and if necessary of the combined temperature/humidity probe is recommended on a yearly basis. It is recommended that Weiss Gallenkamp service engineers perform the calibration as errors may be caused by other factors, such as humidity and temperature controllers.

7. MAINTENANCE

Calibration of Electronic temperature/Humidity Probes

Combined electronic temperature and relative humidity probes carry a valid calibration certificate. Calibration should be checked after one year.

Purified Water Filter

This is located below the purified water inlet, and can be inspected through the viewing hole in the rear of the chamber.

The clear plastic bowl and filter can be removed for cleaning.

Switch Off chamber and ISOLATE from the ELECTRICAL SUPPLY.

↓

Switch OFF
Disconnect water supply.

↓

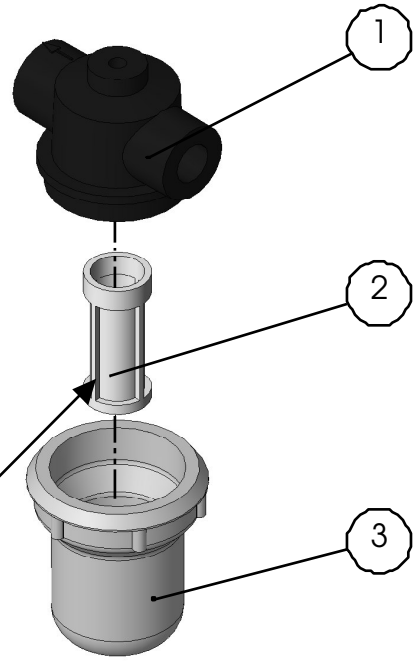
Open instrument compartment door / panel

↓

Unscrew the bowl (Item 3) and remove the filter (Item 2). Clean or replace.

↓

Reassemble in reverse order, ensuring that the filter is refitted the correct way up.



NOTE:
Please check the filter once a month, if it looks dirty, or contaminated clean or replace.

7. MAINTENANCE

Vapour Phase Generator (VPG)

Once a year inspect the VPG for signs of contamination

Switch Off chamber and ISOLATE from the ELECTRICAL SUPPLY.

↓

Leave VPG to Cool down if HOT

↓

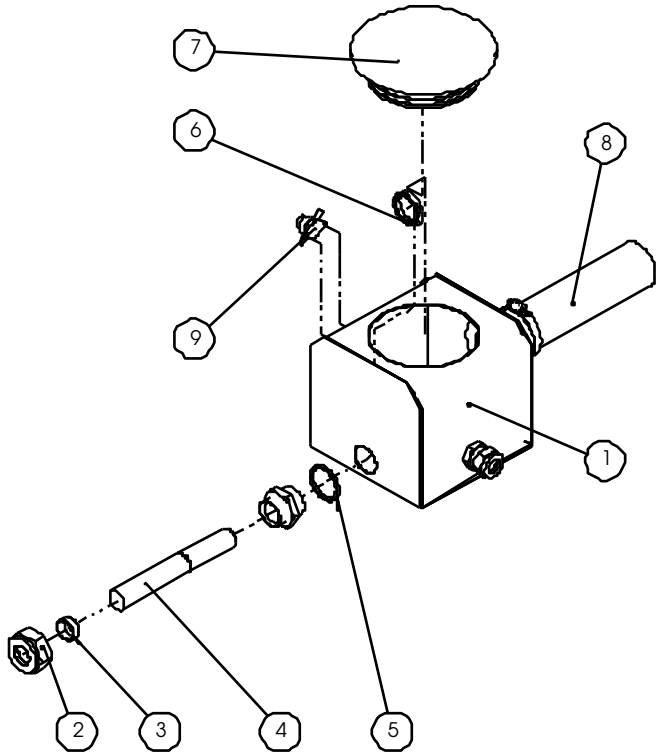
Open Instrument Compartment Door

↓

Remove VPG lid (Item 7) and inspect for any contaminants and clean

↓

Reassemble in reverse order

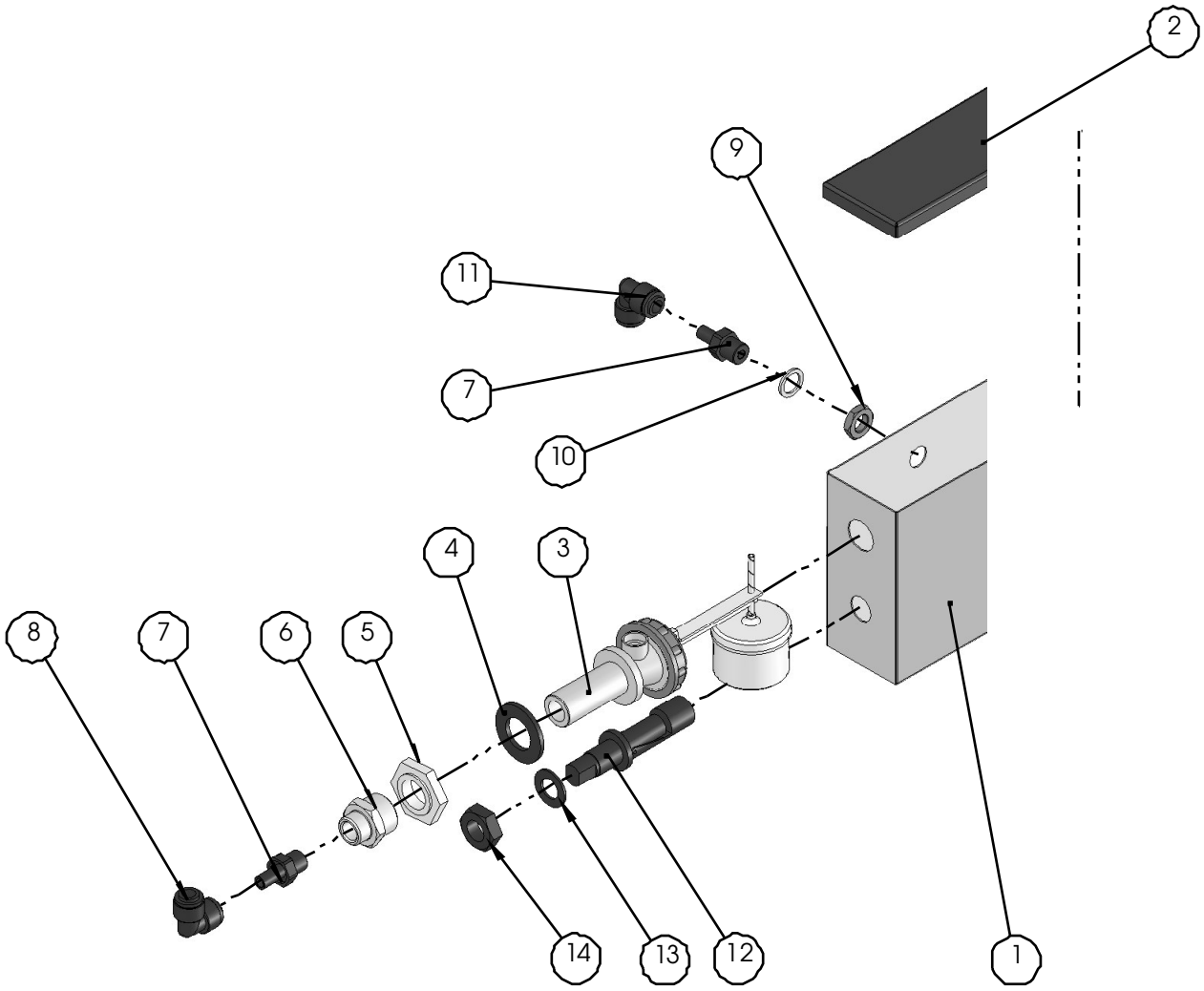


ITEM	DESCRIPTION
1	VPG Tank
2	Wade Coupling
3	Olive
4	1500W Heating Element
5	Washer
6	Nut
7	Bung
8	38mm Silicone Port
9	Thermostat

NOTE: Ultra pure water will destroy the heater element and can cause irrepairable damage to the plant growth chamber. Ensure water of the correct quality is used (see page 15)

7. MAINTENANCE

Torbeck Tank



Item Number	Description
1	Torbeck Welded Tank
2	Torbeck Tank Lid
3	Torbeck Valve
4	Torbeck Washer
5	Torbeck Back Nut
6	½" Adapter
7	Adapter
8	90ºBend
9	Nut
10	Washer
11	90ºBend
12	Float Switch
13	Float Switch Washer
14	Float Switch Back Nut

7. MAINTENANCE

Replacing the Fluorescent Tube

FLUORESCENT LAMPS

Switch Off chamber and ISOLATE from the ELECTRICAL SUPPLY.

Lift Light box cover

Remove the old fluorescent tube by rotating 90º

Align the pins on the replacement tube with the slots in the tube holder and rotate 90º

Shut Light box lid

TUNGSTEN LAMPS

Switch Off chamber and ISOLATE from the ELECTRICAL SUPPLY.

Lift Light box cover

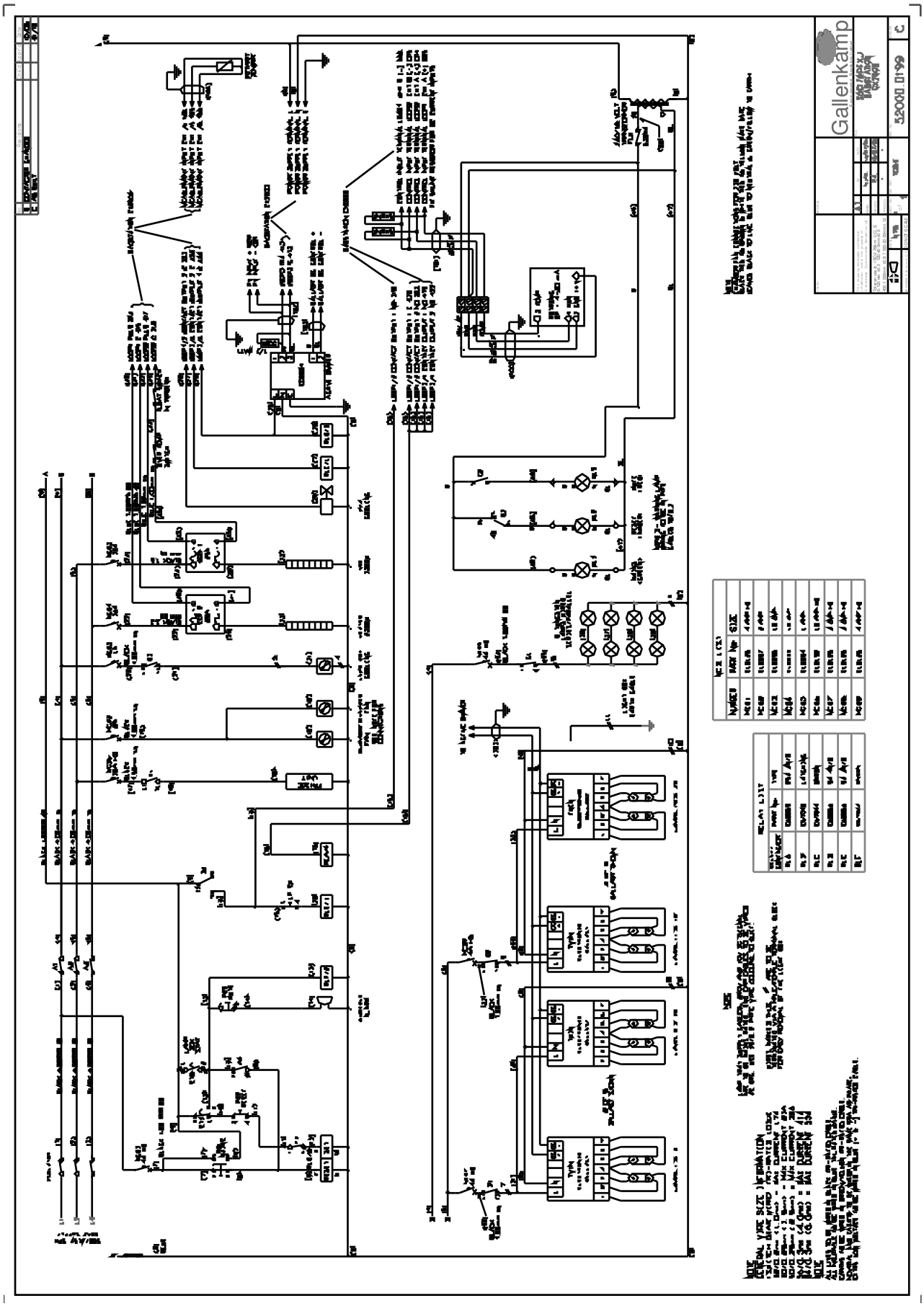
Rotating the end cover plate 90º to expose the end cap and remove the tube

Insert new tube by pushing the end cap into the spring loaded holder and rotate the end cover plate

Shut Light box lid

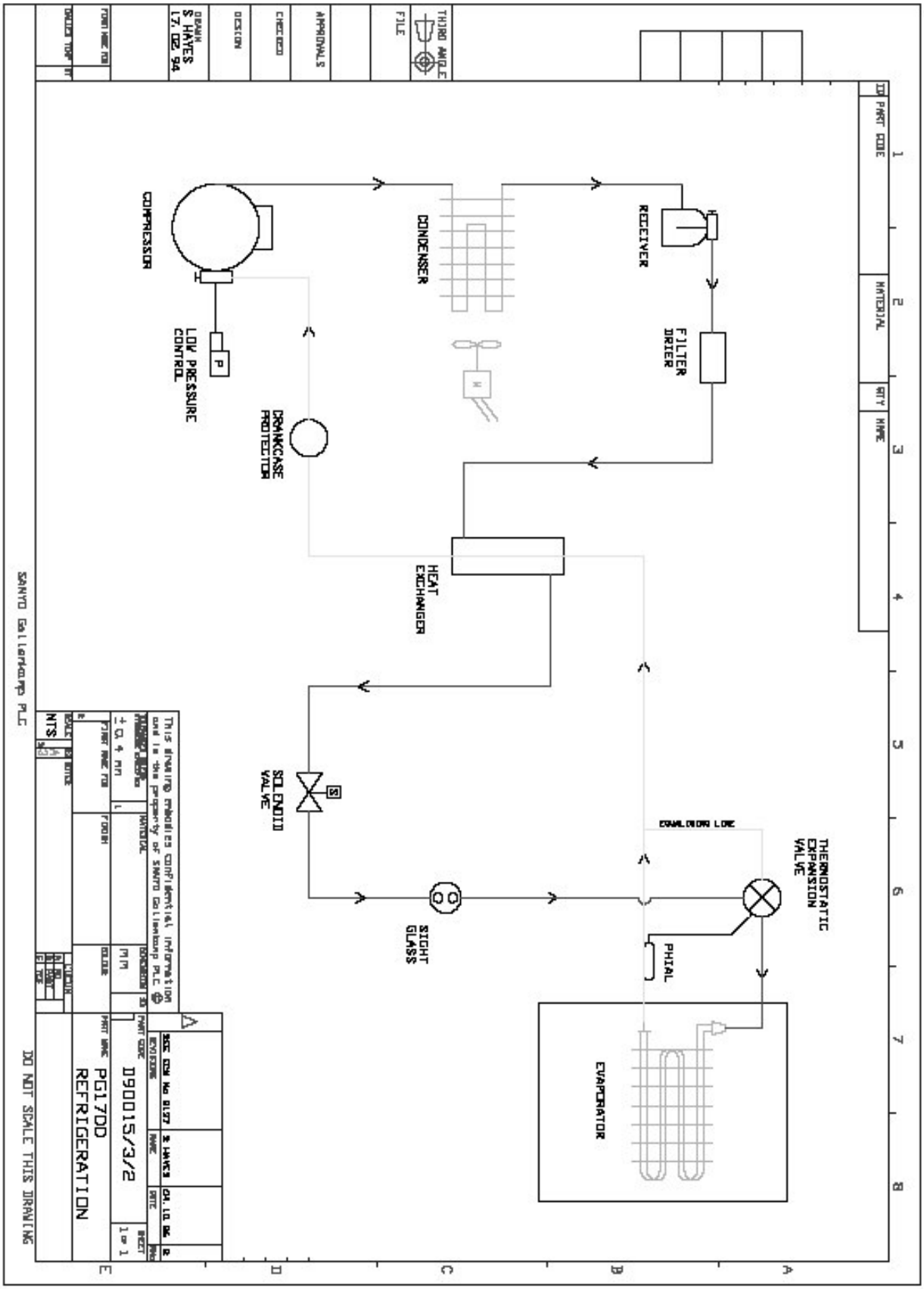
7. MAINTENANCE

Electrical Wiring Schematic



7. MAINTENANCE

Refrigeration Schematic



8. TROUBLESHOOTING

All Maintenance And Servicing Should Be Carried Out By Suitably Trained And Qualified Personnel.

	FAULT SYMPTOM	POSSIBLE CAUSE
CONTROL PANEL		
	Power Switch on but not illuminated	Electricity power failure
		Indicator lamp failed
	Power switch will not switch on	Heater circuit fault
		Vapour phase generator fault
		Refrigeration fault
	Power switch in but controllers not illuminated	Safety thermostat faulty
		Safety thermostat set too low
INSTRUMENT COMPARTMENT		
	MCB trips and will not reset	Fan motor failure
		Air Heater failure
		VPG Heater failure
		Lighting Circuit failure
		Controller electrical failure
		Light Cooling Fan failure
TEMPERATURE CONTROL		
	Cabinet is tripped by safety thermostat	Set point incorrect
	(or over temperature drift)	Thermostat set incorrectly or faulty
		If output on the controller is 0% then controller fault or a refrigeration fault
	Under temperature drift	Set point incorrect
		If output on the controller is 100% then controller fault or heater fault
	Chamber stable but below or above temperature set point	Chamber operated outside environmental specification
		See over and under temperature drift
HUMIDITY CONTROL		
	If the humidity control is too high or low:	Set points are incorrect
		Chamber is being operated outside environmental conditions
		Treatment chamber flooded – wastewater drain blocked
		Low water switch in the torbeck tank broken/damaged
		Thermostat on the Vapour Phase Generator tank tripped – press to reset
		Venting incorrect
		Vapour phase generator heating element failed

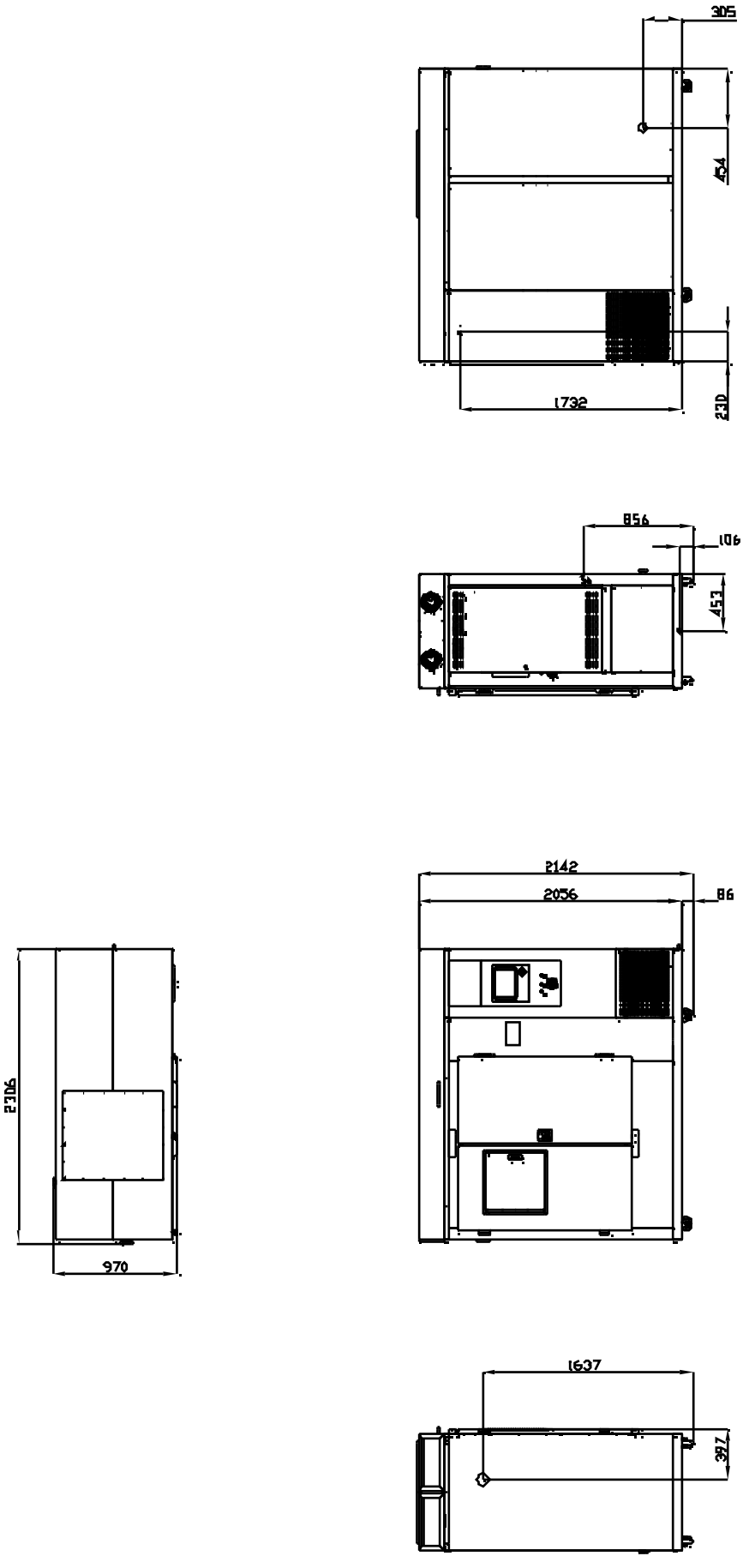
9. SPECIFICATION

Plant Growth Chamber- Specifications

MODEL	SGC170
PHYSICAL	
	Floor Mounted
External Dimensions WxDxH (mm)	2285 x 1000 x 2150
Working Chamber Dims. WxDxH	1400x 800 x 1480
Working Volume	1700 litre
Outer Case	Zinc Coated Mild Steel with stoved acrylic textured finish
Inner Chamber	Type SUS 304 Stainless steel with a reflective coating
Shelves	2 off plastic coated steel half depth shelves
Maximum Shelf Loading	10kg
Maximum Chamber Loading	50kg
Supports	4 Castors – 2 front castors lockable
Weight	500 Kg
Drain	22mm diameter - provided for drainage of evaporator condensate
Vent	Rear silicone vent to allow for air volume expansion and contraction during temperature changes- and prevent vapour build-up
ACCESS	
Air Exchange	1 off Air exchange vent on the front of the chamber
Cable Port	1 off 66mm diameter silicone in left-hand side wall
Doors	Full width / height insulated double doors. Viewing window in LHS door with light shield Instrument, chamber and electrical compartment doors are lockable.
ELECTRICAL	
Supply Voltage	415V 50Hz 3 Phase 50Hz
Maximum Current	17 Amps
WATER	
Purified Water Requirement	For humidification system. Conductivity 5 to 20µS cm^{-1} Supply pressure range 2-14p.s.i. (0.1-1bar). Water filter provided
Drain	22mm diameter - provided for drainage of evaporator condensate to open drainage point
Heat Dissipation	7.32kW
	* Heat Dissipation is calculated at 415 V
CONTROLS	
Controllers	Microprocessor controlled digital temperature and humidity controllers
Sensors	High specification solid-state capacitance humidity probes with PRT temperature sensing.
Humidification	Vapour phase humidity generator with low water level protection for prevention of water borne contamination.
Heating	'Inconel' electrical resistive heating operating at 'black heat'.
Airflow System	Vertical airflow direction upwards @ 0.2m/s.
Lighting	20 off 58W TLD 84 Fluorescent tubes plus 8 incandescent lamps air-cooled in a light box. Variable intensity from 10% to 100% of maximum.

System Management	Microprocessor based integrated system management for reliability and high energy efficiency and rapid condition recovery following sample loading
PERFORMANCE	
Ambient Operating Range	+12°C to +25°C
Temperature Only Control Range	+7°C to +40°C (lights on) 0°C to +40°C (lights off)
Temperature Fluctuation (with time)	±0.3°C @40ºC
Temperature Uniformity (spatial)	±1°C
Temperature & Humidity Control Range	25% to 88% @ +40ºC 42% to 95% @ +20ºC 50% to 95% @ +10ºC
Humidity Uniformity	±3% relative humidity on average
Air Velocity	0.2m/sec (turbulent) (average within empty working chamber)
SAMPLE LOAD PROTECTION	
Safety Thermostats	Independent high safety thermostat capable of shutting down chamber.
OPTIONAL ACCESSORIES	
Water Supply	Self contained recirculating purified water system - with filtration, deionisation and UV sterilisation built-in.
Compliance CE	Compiles with the essential health and safety requirements of Machinery Directive 98/37/EC and its amendments Electromagnetic Compatibility Directive 89/336/EEC and its amendments Low Voltage Directive 73/23/EEC and its amendments

9. DIMENSIONS



SGC170 Dimensions

10. SPARE PARTS LIST

PART NUMBER	DESCRIPTION
K06517	Main Door Seal
K06541	Inspection Door Seal
E70118	2500W Chamber Heating Element
33100.221	1500W VPG Heating Element
K04648	Air Circulation Fan Motor
E20036	Fluorescent Tube
E20505	Tungsten Lighting
E22550	Lighting Ballast
K02191	Lamp Box Cooling Fan
E13033	Fuse Anti-Surge 630mA
E04041	Temperature and Humidity Sensor
K02302	Water Filter
36090.035	Float Switch For Torbeck Tank
37070.008	Thermostat For VPG Tank
E47027	Thermostat For Lamp Box
E47028	Thermostat For Chamber
K04346	Latch Key For Main Door
K06607	Replacement Mesh Shelf
K06608	Mesh Shelf Support Rods
K06719	38mm Port Plug
K06720	66mm Port Plug
72100.472	VPG Bung

11. Disposal/Decommissioning

The removal of components after their use should be environmentally friendly. The chamber should be delivered to a company that specialises in the complete removal.

The table below lists all details of removal and repeated use of individual parts of the chamber

Product	Material	Removal
Steel construction frames, Impellers, pipelines	Metals	Separation of materials Melting procedure for repeated use (recycling)
Insulated case and doors	Metals, PU foam	Separation of materials Special incineration procedure
Cables casings and plugs	Rubber, PVC, silicone, PTFE and similar artificial materials	Separation of materials Recycling
Electronic Assemblies	Artificial materials, metals, electrolyse	To special waste dumps in compliance with all local regulations
Fluorescent Tubes	Glass, metals (inc. Mercury)	To special waste dumps in compliance with all local regulations

Products with coatings should be delivered for processing to enable their repeated use, depending on the type of coating, or be taken to special waster dumps in compliance with all local regulations

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