SECURE-TOUCH+

**SWIFTLOCK
VACUUM
STERILIZER**

Includes versions with
Optional Heated Jacket

ENGINEERING &
PROGRAMMING
MANUAL

B&R Controller

Part No MXN736 issP01 ed a

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TABLE OF CONTENTS

Introduction

The USER operation of the SECURE-TOUCH COLOUR + Control system is detailed in a in separate USER OPERATING manual ;-

MXN736	**PROGRAMMING MANUAL (this document)**
MXN738	**USER OPERATING MANUAL FRONTLOAD MODELS**
Or MXN738	**USER OPERATING MANUAL TOPLOAD MODELS**
MXN785	**CALIBRATION MANUAL (available to approved engineers)**

SAFETY WARNING   IEC61010

In accordance with IEC61010

The safety features and protection for the operator in this equipment are only designed to operate when the equipment is used in the way described in these instructions. & if used in any way not specified such protection may be impaired.

DOCUMENT ISSUES AND DETAILS

Date	Issue & Edition	Filename	Detailsof changes and revisions
Nov 2012	Po3 ed a	mxn736- B&R eng-programming swiftlock vacuum eda .doc	Original issue [based on MXN702]

SAFETY VALVE
IMPORTANT INFORMATION

All these machines contain a Safety Valve (PRESSURE RELIEF SAFETY VALVE)

To comply with typical safety regulations this must be kept in a serviceable condition and it must also be regularly tested. Test periods depend upon local regulations , however ;-

Astell Scientific advise that the Safety Valve should be tested every 3 months.

A special SAFETY VALVE TEST CYCLE is provided to make this easier, accessed from the Supervisor level.

SERIAL NUMBER & VOLTAGE
RATING PLATE

This is the metallic plate sited on the back panel of the machine.
it provides various information including;-

Serial Number
Model Number of the machine
Model number of accessories or options.
ELECTRICAL ratings

IMPORTANT
You MUST quote the Model & Serial Number for spares orders and service requests.

To avoid having to move the machine for access record these for future use.

Model No	Serial No

ELECTRICAL FIRE RISK
HANDLING/MOVING
POSITIONING/LOCATION
POWER, WATER & DRAINAGE
SAFETY SYSTEMS
SPARES & SERVICE

For Details of all these aspects & use of your machine please refer to the appropriate OPERATOR INSTRUCTION MANUAL.

FULL AND PARTIAL CALIBRATION
INFORMATION

For Details of all these aspects & use of your machine please refer to the CALIBRATION MANUAL

PROGRAMMING & OPERATING INSTRUCTIONS

The following Sections provide Basic Operating instructions & Cycle Programming Information for the control system

Full details of the Cycle Entry Procedure and further technical details are provided in sections in this manual.

Other options such as the RS232 Communications option are detailed in separate instruction manuals.

INFORMATION ON APPROVED USE

This equipment is only designed for use other as a medical or laboratory general steam steriliser within the temperature and pressure ratings of the chamber design.

Any alternative use or method of operation not covered and specified within this and associated instruction manuals is specifically excluded and may be hazardous. The manufacturer does not approve such alternative use and under no circumstances will the manufacturer or his agents accept responsibility for loss, damage, or injury, consequential or otherwise, as a result of such alternative use.

The manufacturer reserves the right ,in certain cases, to reassess &/or amend the design or specification, and provide individual written instructions detailing any alternative use that is considered acceptable.

This Steriliser Is designed and intended for a very wide range of loads and process cycles. It is not possible in this manual to encompass every possible cycle or load requirement that may be encountered.

General principles are provided , with a selection of examples and explanations. A certain amount of experimentation may be required before the most suitable process cycle or method of loading can be arrived at.

Astell Scientific and approved agents are able to offer advice and assistance in setting up and commissioning this steriliser. Please consult Astell Scientific or your supplier if necessary

SAFETY VALVE TESTING

This machine contains a Safety Valve (PRESSURE RELIEF SAFETY VALVE)

To comply with typical safety regulations this must be kept in a serviceable condition and must be regularly tested. Test periods depend upon local regulations ,;-

Astell Scientific advise that the Safety Valve should be tested every 3 months.

A special SAFETY VALVE TEST CYCLE is provided to make this easier,

This is accessed from the ENGINEER level.

Safety valve Position

The Safety Valve is situated in different positions depending upon model specification and size. & is generallymounted at the rear or the side discharging downwards in a position allowing access to the valve for servicing

All models – have an Automatic Safety Valve Test Warning System and monitor the date since the last Safety Valve Test Cycle was performed .

Every Power-On & Cycle Start the system checks the current date and shows a warning after the (normally 3 month) set period has elapsed,

Note that this period is set to meet the requirements of most countries for Steam Safety Valve Testing.

TO CANCEL WARNING
The only way to cancel this warning is to complete a Safety Valve Test Cycle.

SAFETY VALVE TEST   QUICK REFERENCE

TOUCH

SELECT "SETTINGS"

TOUCH

SELECT "SITE ENGINEER"
ENTER "333333"

SELECT "EDIT MACHINE SETTING"

SELECT "TEST CYCLE"
(Background Turns Green)

TOUCH

(3 Times = Return To Main Menu)

CLOSE & LOCK DOOR

TOUCH [to select cycle]

SELECT "TEST CYCLE" ON MENU

TOUCH "START"
(To Start Cycle)

TEST CYCLE IS NOW RUNNING

When steam is seen coming from the safety-valve outlet, touch [✓] to terminate the test and advance machine into cooling.

LEAVE UNTIL COMPLETE
& THEN OPEN DOOR

IMPORTANT   *
THE MACHINE MUST BE ATTENDED AT ALL TIMES UNTIL TEST IS COMPLETED.

IF THE SAFETY VALVE DOES NOT OPERATE AT THE STATED PRESSURE IT MUST BE CHECKED AND ADJUSTED BY A QUALIFIED ENGINEER.

SECURITY ACCESS & PASSWORDS

The security system splits the users of this machine into the following groups

- **OPERATORS**
- **SUPERVISORS**
- **SITE ENGINEERS**
- **ASTELL ENGINEERS**
- **DEVELOPERS**

In each group there can be several individuals each known by name, and each with a different Security Password Number (sometimes–called a PIN)

ENTERING PASSWORDS

Press the Button

for MAIN MENU

On the MAIN SETTINGS MENU ;-
NOTE- THERE MAY BE EXTRA OPTIONS SHOWN ON THE MENU

For example- Press the SETTINGS button.

Now you have to LOG IN with your PASSWORD
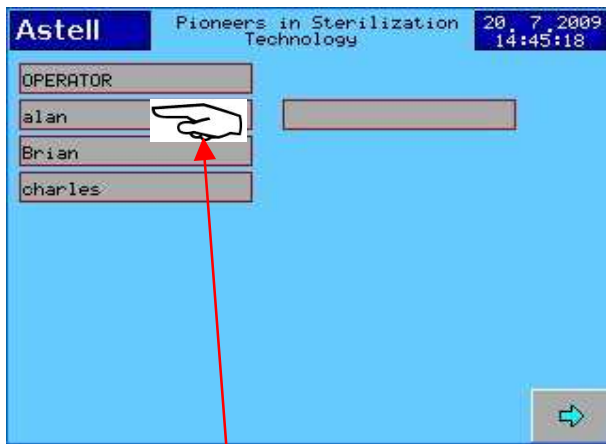
Touch your User name;-

If you are not an "Operator" touch the arrow button to display the other groups, eg Supervisor, Site Eng,etc;-

Touch on the PASSWORD Bar;-
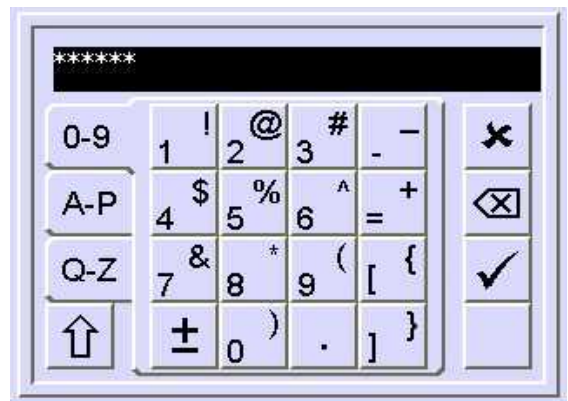
Type your Password ;-,

Enter 6 Characters , then [✓] (Enter)

The keypad covers 3 ranges of characters, selected by the "TAB" keys [0-9+ punctuation],[A-P] & [Q-Z]

✓	Enter
⌫	Backspace
✗	Cancel
☐.	Space
⇧	Shift (Next Character upper case)

> If you enter an incorrect password you are returned to the Main Menu

TO CHANGE YOUR PASSWORD

Log in as described above

Example- we will log in as "Operator"

Press EDIT PASSWORDS

Press CHANGE Your PASSWORD

We will change password to "123456 "

Touch the PASSWORD bar
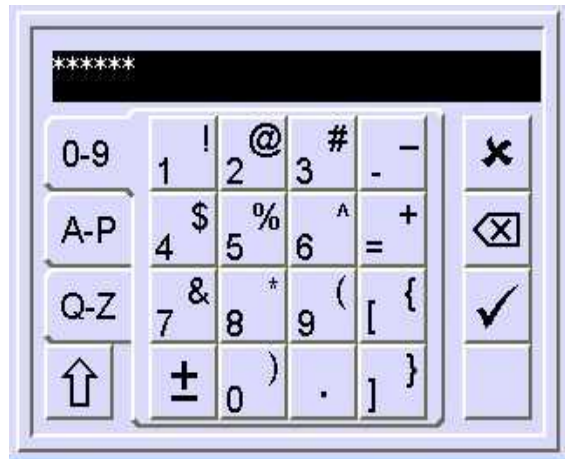
Key in the required PASSWORD.
Eg "123456"

Then Press **[✔] (Enter)**

Confirm the new password when asked
Press **[✔]** again

Press ⬅ twice for the Main Menu

TO CHANGE OR ENTER USER NAME

SUPERVISORS
SITE ENGINEERS
ASTELL ENGINEERS
DEVELOPERS

The Passwords and Names for all levels of users are added and edited as follows ;-

You can ONLY change the Security Password of yourself or a user at a LOWER level than you,

- **SUPERVISORS** can change operator Passwords
- **SITE ENGINEERS** can change Supervisors & Operator Passwords
- **ASTELL ENGINEERS** can change the Site Engineers , Supervisors & Operator Passwords
- **DEVELOPERS** can change all Passwords

Example – Add an Operator

Log In with a Supervisor password.

We will ADD an Operator Name ;- " David "
(The number of menu options may be different)

Touch the screen

Touch a blank line on the screen.

Touch Here

Touch "EDIT USER NAME" bar

The Alphanumeric Keyboard appears -
Type the Name - eg "David"
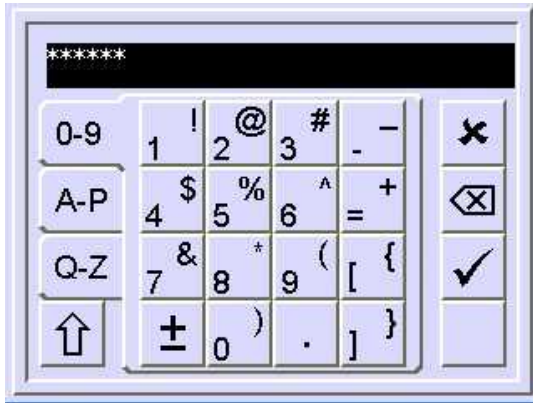
Then Press [✔] **(Enter)**

The keypad covers 3 ranges of characters, selected
by the "TAB" keys [0-9],[A-P] & [Q-Z]

✓	Enter
⊠	Backspace
×	Cancel
□.	Space
⇧	Shift (Next Character upper case)

Enter the new Password for the new user

Confirm the new password when asked
Then Press [✔] **(Enter)**

Press   twice = Back to Main Menu

Notes-

A   All Passwords must be different.

B   If you make an error in the password the
         system will skip back to the previous
         menu.

SELECTING A CYCLE

NOTE – Names,temperatures,times etc Will probably Differ from the examples shown here

Press "CYCLE SELECT" button

This will take you to a screen where you can select any one of the available Cycles.

SCROLL UP   **SCROLL DOWN**   **Back to last screen**

Touch on the selected Cycle
(Here we have chosen "INSTRUMENTS")

Note that the Names, No & Type of cycles available depends on the machine specification

The display "START" button changes to Green Showing a CYCLE has been selected

Changes Colour to show Cycle Selected   "FILE" Icon **(Press To Change The Cycle Selection)**

To CHANGE CYCLE
If you wish to select a different Cycle press the Button

Then select the different cycle

WARNING!

The NEXT press on the Button

Will START the Cycle!!

STARTING A CYCLE

The Chamber Closure Door /Cover must be closed and locked

Select the chosen Cycle Cycle, as above

Press button to START cycle

DELAYED START OPTION
*IF DELAYED START is NOT SELECTED
in "Cycle Settings" . the Cycle Starts immediately
(SHOWN ON NEXT PAGE)*

Enter the START Time

For each of the Time Or Date Figures You Wish To Change ;-
          Touch the Figure on the screen.

Eg
To change
the DAY

Type the Day you want using the numeric keys
 Then Press **[✓] (Enter)**

When you are happy with the Date and Time shown Press the Button To save the changes.

The system starts the DELAY TIMING stage……..
When the elapsed time is reached, the system will go to   **"START".**

Safety Note
If anything happens that could affect the safety of the unit it will exit the Delay Start Countdown automatically , including   in the case of power failure

IMMEDIATE MANUAL START
          If required to start
          Manually during timing
          Press the Start button

CANCEL DELAYED START TIMING

1   Press

2   Select   ✖ STAGE JUMP CONTROL

3   Login with your password etc

4   use ↑ & ↓ ;-

To START select Stage 1

JUMP TO STAGE
1   FREE STEAMING
2 HEAT TO STERILISE

To CANCEL select COOLING – stage 4

3   STERILISE
4   COOLING
5   COMPLETE

5   Press

STARTING CYCLE (DELAYED START OFF)

The Chamber Closure Door /Cover must be closed and locked

Select the chosen Cycle, as above

Press button to **START cycle**

The system starts to run the CYCLE PROCESS stages –
The first Stage for most cycles is PRE-VACUUM

CYCLE STAGES

NOTE
Not all machine versions have ALL of the cycle stages available. – If in doubt consult Astell Scientific or your Agent

PREVACUUM STAGE
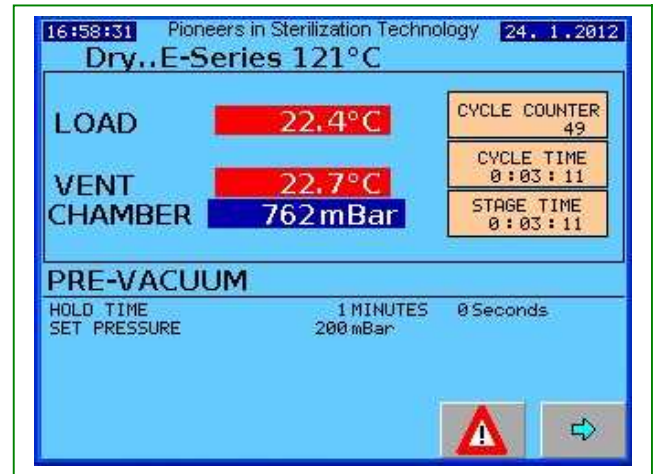
Parameters=
Hold time   mm:ss
This is the   HOLD TIME at the set pressure level.
Example here is 1:0 minutes

Set Pressure   mBar
The Vacuum level for the Prevacuum stage

The Vacuum pump operates and reduces the pressure.
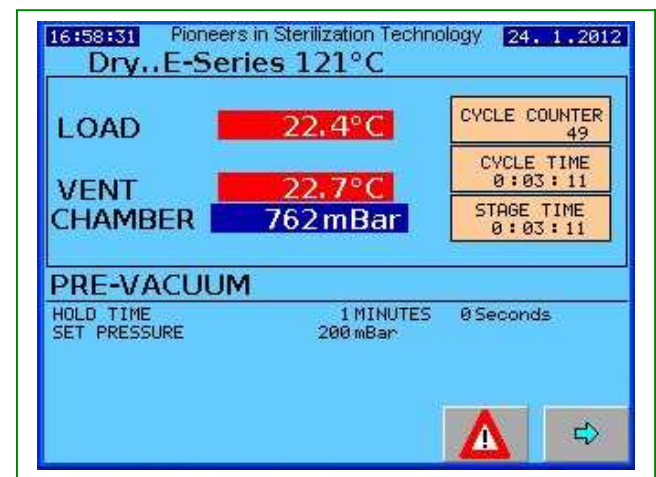
When the SET PRESSURE is reached   the Hold time starts.
At the end of the Hold Time the system goes to the next stage.

FREESTEAM STAGE

This stage is used for air removal to gradually warm up the autoclave and load (< 100° C) for a predetermined time.

Parameters;-

HOLD TIME   MM:SS
This is the   FREESTEAM/FREESTEAM TIME
Example here is 5.0 minutes

SET PRESSURE   mBar
Maximum pressure allowed   during the Freesteam period. Under certain conditions the pressure can build up and this will affect the purging efficiency. The system prevents this .

SET POINT TEMP   C
This is the Chamber temperature at which the the FreesteamPeriod will start timing.

STAGE TIME   00:YY:YY
The time represented in this example by YY:YY etc is the elapsed duration of this stage. This will count up during the stage

CHAMBER TEMP
This will rise towards 95 C

(SET TEMPERATURE is normally 95C.)

When the SET TEMPERATURE is reached the FREESTEAMING TIME STARTS

The Freesteam STAGE   TIME will count up to the set hold time. The CHAMBER TEMPERATURE will rise from 95C to typically between 101-104C

After the Freesteam period ends, the system goes to the next stage

NEGATIVE PULSING

This stage starts with a vacuum & admits steam into the chamber to partially replace the vacuum. It is controlled by high and low pressure set-points or high and low time set-points (dwell time). When the steam has been admitted to the upper setpoint/time the Vacuum pump draws a partial vacuum to the lower setpoint/time. Stage continues for a predetermined number of pulses.

Parameters;-

DWELL TIME   MM:SS
This is the   time   held for each pulse
Example here is   20 SECS

SET PRESSURE HIGH   mBar
This is the pressure at "Maximum" of the   vacuum pulse

SET PRESSURE LOW   mBar
This is the pressure at "Minimum" of the   vacuum pulse

SET POINT TEMP   C
This is the Chamber temperature

NEGATIVE PULSE COUNT
The no of pulses

When the   NEGATIVE PULSES   are completed the system goes to the NEXT STAGE

POSITIVE PULSING

This stage follows a Vacuum stage & admits steam to the chamber to increase pressure to a positive value. It is controlled by high and low pressure set-points or high and low time set-points (dwell time). When the steam has been admitted to reach   the upper setpoint/time the Vacuum pump draws a partial vacuum to the lower setpoint/time. Stage continues for a predetermined number of pulses.

Parameters;-

Dwell time   mm:ss
This is the   time   held for each pulse
Example here is   20 SECS

Set Pressure High   mBar
This is the pressure at "Maximum" of the pulse

Set Pressure Low   mBar
This is the pressure at "Minimum" of the pulse

SET POINT temp   C
This is the Chamber temperature

Positive pulse count
The no of pulses

When the   POSITIVE   PULSES   are completed the system goes to the NEXT stage

HEAT TO STERILISE

This stage is before the main sterilisation process, & is controlled by pre-set pressures and the selected temperature probes. The stage continues for a predetermined time. (stabilisation time).
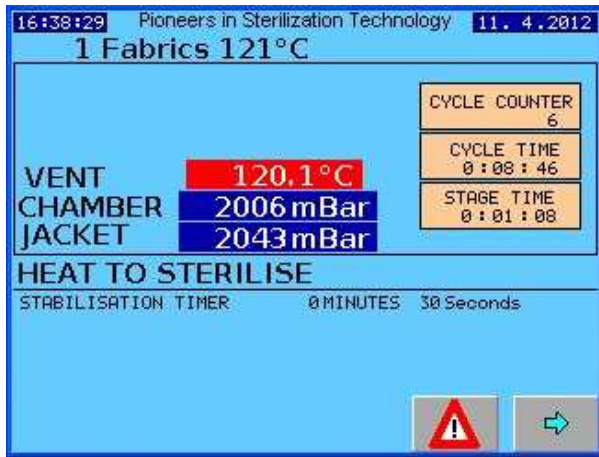
Parameters;-

STABILISATION TIME   MM:SS.S
This is the   time period allowed for the system to "STABILISE" before the Sterilise stage starts.

CHAMBER TEMP
This will rise towards The Sterilisation set temperature

CHAMBER PRESSURE
This may rise in line with the temperature rise

STERILISE STAGES

The STERILISE temperature is reached .
The STABILISATION TIME begins
The stage continues to show Heat To Sterilize
But the Stage timer counts up to the Timer setting

This example is 21 secs into 1 min stabilise time

STERILISE TEMP   °C
 The Sterilize Temperature – here 121.0C

STAGE TIME   **00:YY:YY.Y**
The time represented in this example by YY:YY etc is the duration of the Stabilise stage. This will count up until the STABILISE   time is reached then the next stage will begin - *STERILISATION*

STERILISE STAGE STARTS

This stage is the main sterilisation process. & introduces steam into the jacket (if selected) to a set pressure and into the chamber to a set pressure. This is Started by the selected temperature probes and the Pressure and hence temperature are controlled by the pressure set-point. The stage continues for a predetermined sterilisation time.
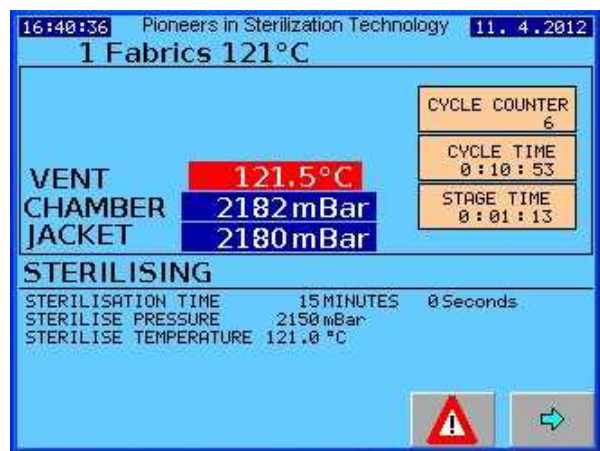
Parameters;-

STERILISE TEMPERATURE   °C
This is the temperature at which the Chamber will be controlled through the Sterilise Stage .

STERILISATION TIME   mm:ss.s
This is the   time period the system to hold at the Sterilise Temperature.

STAGE TIME   00:YY:YY.Y
The time represented in this example by YY:YY etc is the elapsed duration of this sterilisation stage. This will count up during the stage until the STERILISE time is reached

Example here "1min 13 sec" after the start of stage

COOLING STAGES

At the end of the STERILISE TIME the behaviour of the system depends upon the type of cycle that is running.

First is VENTING

VENTING
This stage is used to drain water from the chamber after the completion of the sterilising stage. When the Vent Pressure is reached Water is blown out by the steam pressure through the drain , followed by the excess steam pressure, until the pressure is almost down to atmospheric pressure.

Note that For **Dry Cycles** the Vent Pressure is approx 1600 mBarAbs. For **Wet / Fluid cycles** this is 1100 mBarAbs

This is because the shock of a full vent to near atmospheric would exaggerate any boiling over in the load.

… Then,

Cycles for WET/FLUIDS LOADS- eg Media Prep.- Cycles, go to COOLING

Or

Cycles with LOAD DRYING – eg Instruments, or Glassware , go to DRYING

COOLING
This stage cools the autoclave and load. Water is pumped through the jacket .(optionally if air ballasting is fitted . air is blown into the chamber.)
Air is admitted into the chamber via an optional microbiological filter. The stage continues until the temperature of the selected probes and an independent cool interlock Thermostat have satisfied the pre-set conditions (usually below 80°C as per HTM2010) **Additionally a timer ensures that a minimum cooling time has elapsed.**

Parameters;-

COOLING TIME
MINIMUM time period allowed for the system to COOL before the NEXT STAGE. safety precaution to ensure cooling if this stage is set wrongly.

OVERRIDE TIME
This is the MAXIMUM time period allowed for the stage- if exceeded it will cause a FAULT .

COOLING TEMPERATURE $^{\circ}$C **
(Dry Cycles disregard this setting)
This is the COOLING LOCK RELEASE TEMPERATURE – [to differentiate between this and the Cooling Lock thermostat setting] The System must cool down to AT LEAST this Temperature before the COMPLETE stage can be reached & door can be opened.
Applies to Wet/Fluids/Media Loads only

STAGE TIME 00:YY:YY.Y
The time represented in this example by YY:YY etc is the elapsed duration of this stage. This will count up during the stage

The next stage is AIR BREAK which allows a period of time for the pressures to equalise between inside and outside

Example   DRY CYCLE (with DRYING)

DRYING STAGE

This stage is used to dry the autoclave by allowing steam into the jacket and evacuating the chamber via vacuum down to a pre-set set-point and timer.
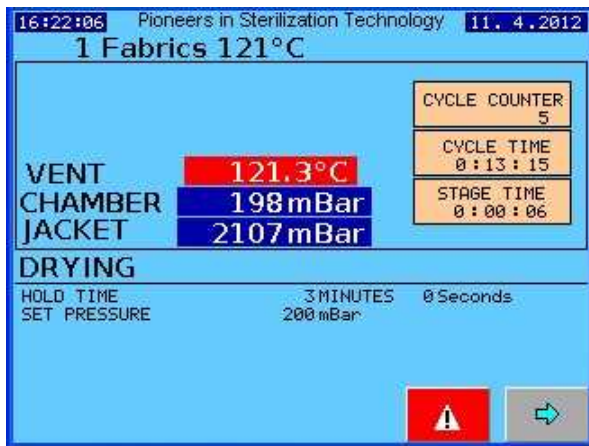
Parameters;-

HOLD TIME   MM:SS
This is the   DRYING TIME
Example here is 5.0 minutes

SET PRESSURE   mBar
Pressure at which the Drying Time starts

STAGE TIME   00:mm:ss
This is the elapsed duration of this stage. & counts up during the stage

CHAMBER TEMP
This will fall as the vacuum increases.

When the set Pressure is reached the HOLD TIME starts and this is shown on the STAGE TIME
The vacuum will continue through this time period.

At the end of this time cycle goes to AIR BREAK

Drying works by reducing the pressure and holding the temperature up with the heated jacket, to maintain the load at a temperature above the boiling point of water. Thus the water boils off. The boiling removes latent heat and would cool the load rapidly however this is made up by the heat input from the jacket

This is why a load cannot be Dried satisfactorily without a heated jacket.

AIR BREAK

This stage allows air (normally through a 0.01 micron filter) into the chamber. When the chamber has achieved atmospheric pressure the screen will go to the complete stage
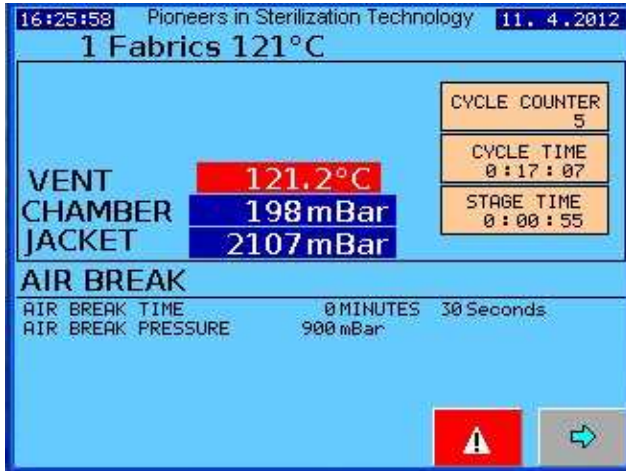
Parameters;-

Air Break Time

The additional time for the airbreak AFTER the Air Break pressure has been reached.

Air Break Pressure
The pressure that releases the air break stage
To go to COMPLETE.

If the cycle has completed correctly & no faults have occurred the Final stage is;-
 "CYCLECOMPLETE PASSED"

CYCLE COMPLETE -- PASSED

Press the DOOR button.

The LOCKING BOLT withdraws
Releasing the door……..
ROTATE the DOOR HANDLE
& OPEN THE DOOR

Manual door models-
 If you do not open   the door, After approx 10 Seconds the door will Re-Lock itself

The STERILISE CYCLE is now Completed.

You may unload and use the contents

CYCLE COMPLETE -- -FAILED

If the cycle has failed for some reason the final stage is "CYCLE COMPLETE -- -FAILED" below
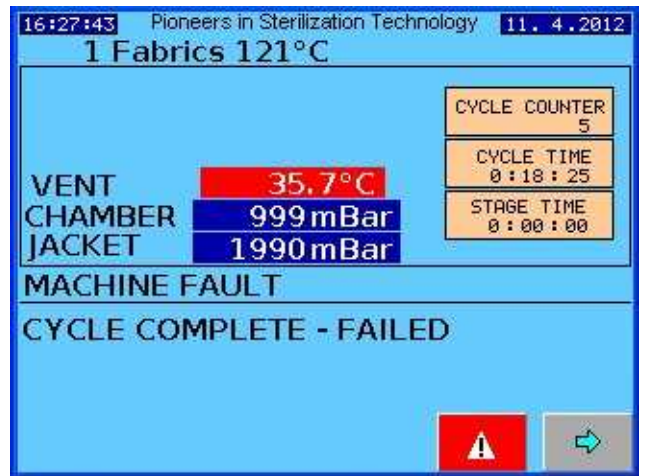
The STERILISE CYCLE is Complete. BUT you will have to sort out the reason for the cycle Failure.

Press the ALARM button to go to alarms page so you can investigate, then   correct & reset the alarm

You will need the Supervisor Level password or higher.

Clear the Alarm and return from the alarm page.

You will be able to press the DOOR button to open the door **

** If the Sterilize stage has been set to "STERILIZE RETRY" ….then the you can not open the door but you can Restart the Cycle .

Please see next Page

IS THE LOAD SAFE??
After a failed cycle, you can carefully unload the chamber but a microbiological assessment is needed before use of the load ;- You will need to judge whether the load has undergone sufficient processing to be sterilised enough to be safe or satisfactory to use.

STERILISE THE LOAD AGAIN?

In the STERILIZE stage settings you can choose the action *;-

1   **STERILIZE RETRY**
Do not open door- sterilize again
or
2   **SAFE STAGE**
Safe to open door

SAFE

Some loads such as MEDIA will normally be safe after a failed cycle and might even be useable, depending on what went wrong.

If set to "Load is safe" then you must log in with the password and clear the alarm that caused the failure but you can then open the door and unload.

UNSAFE

If the load would have pathogens present due to the sterilization failure then handling it would be dangerous. If set TO STERILIZE THE LOAD AGAIN then you will need to clear the alarm and then the only choice you have is to start the cycle again. You cannot open the door.

OTHER SPECIAL STAGES

LEAK TEST

(if selected) This stage is used to check for leaks within the autoclave at the beginning of the cycle. It is for porous load machines only.

Successful LEAK TEST cycle
On a successful leak test cycle (i.e. no alarms present and allowable leak rate) the following screen will be displayed.
To proceed, the display has to be touched anywhere and the cycle complete screen will then be displayed.

Unsuccessful LEAK TEST cycle
On an unsuccessful leak test cycle (i.e. alarms present and/or high leak rate) the following screen will be displayed.

To proceed, touch the display anywhere and the password screen will be displayed. Enter the correct password, reset the fault condition and the door of the autoclave can be opened. The cycle will reset.

AIR WASH

This stage assists the reduction of humidity (on an Empty Glassware cycle) and helps extinguish any residual steam, which could be present at the end of a cycle (mainly Plastic Discard).

STAGE JUMP & STOP CYCLE

- **The STAGE JUMP facility is not available to the OPERATOR LEVEL**
- **The facilities are restricted for other users depending on the Security level.because some jumps could cause problems**
- **ASTELL Engineer level can jump all ways.**
- **Stage changes cause a "failed" cycle**

MANUALLY JUMP STAGES

At any point during the cycle you can press the Button

This will take you to the MAIN MENU

Press the STAGE JUMP button.

LOGIN with your User-Name and password
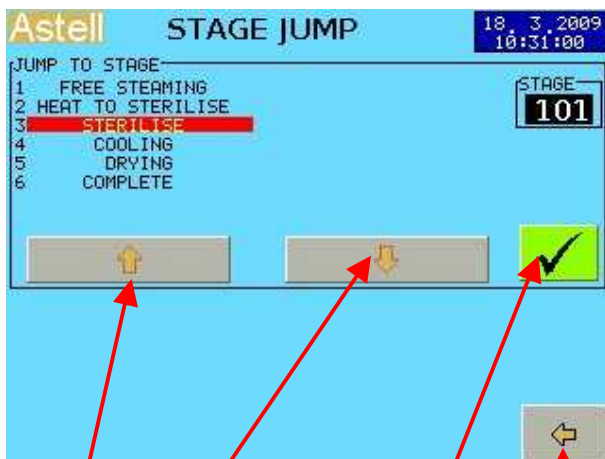
Use these two buttons to select the stage you wish to JUMP TO

Then press ✓

Or ← to Exit

Answer the ARE YOU SURE? Question

MANUALLY STOP CYCLE

Press the Button for MAIN MENU & Select

STAGE JUMP CONTROL
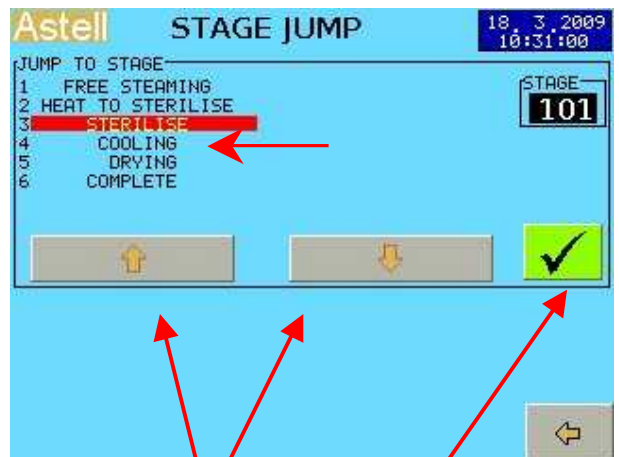
Use buttons to select COOLING

Then press the ✓ button

Answer Yes to ARE YOU SURE?

This will change the stage & the result depends on the selected Cycle "Type"

- fluid loads will cool down …and eventually cool to "Complete Failed Cycle"

- Instrument/Glassware "drying" loads omit cooling, vent the water and once pressure has gone, go to "Complete Failed Cycle"

Note- The door cannot be opened until COMPLETE ,when cooling has finished.

SAFETY VALVE TEST CYCLE

SELECT SAFETY VALVE TEST

This special cycle is for testing the Safety valve.

Press Button
    for   MAIN MENU
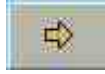
SELECT " SETTINGS" Password screen opens
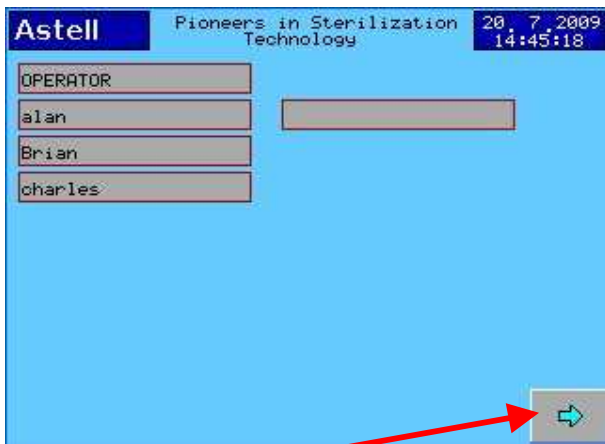
Touch   ARROW
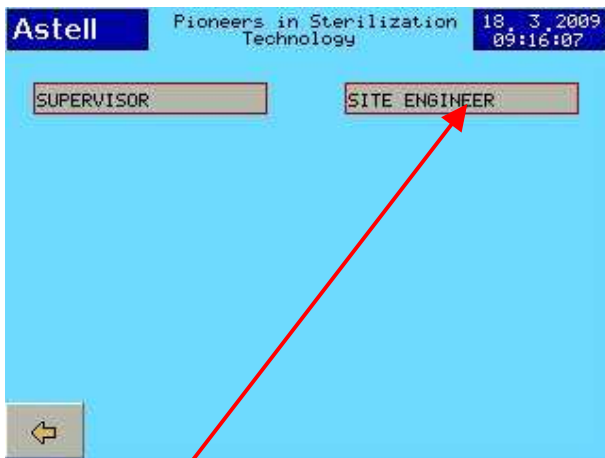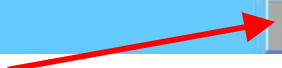
Select "SITE ENGINEER

Enter Site Engineer password eg 3 3 3 3 3 3

SELECT "EDIT MACHINE SETTING"

SELECT "Safety TEST"
    (The Background Turns Green)

TOUCH arrow 3 tImes
  (Return To Main Menu)

CLOSE & LOCK CHAMBER DOOR

The safety valve test will now be availabl
 in the program selection page

STARTING A SAFETY VALVE TEST

IMPORTANT
THE MACHINE MUST BE ATTENDED AT
ALL TIMES UNTIL THE TEST IS COMPLETED.

Touch Grey START Button

Select "SAFETY TEST CYCLE" on menu

Touch   Green START Button
…..TEST CYCLE BEGINS…..

The chamber will continue to heat to above 134C.
The Pressure will rise.

At a pressure of between 3.64 and 3.88 Bar(abs)
the safety valve must operate.

When the safety valve operates this will show as a
burst of steam from the safety valve outlet

Observe this carefully to check it takes place
When you are satisfied the safety valve has
operated

Press Button
"Safety-Valve- Test- Complete"

*The purpose of this is to show that the   Safety
Valve opening has happened - so that we can be
sure that it would do so correctly in the event of a
high-pressure problem.*

The system will go to the COOLING stage and cool
down normally. When it reaches "Complete" you
may open door

This completes the Safety Valve Test

IMPORTANT

IF THE SAFETY VALVE DOES NOT
OPERATE DURING THE TEST AT THE
STATED PRESSURE THE MACHINE
SHOULD NOT BE USED UNTIL IT HAS
BEEN CHECKED AND ADJUSTED BY A
QUALIFIED ENGINEER

LOAD - SENSED TIMING

Note ;- LOAD SENSED TIMING is an optional extra that may be installed on the machine- If the required extra parts are not installed then this option cannot be used.
(It can be retro-fitted to a machine on site if required.)

All Steriliser loads have "Thermal Mass". This means that the load will ALWAYS heat up more slowly than the actual Steriliser chamber and display. If allowances are not made for this in the sterilise Cycle profile, the load will not be subject to correct sterilizing conditions, ie it will be exposed to the sterilise temperature for too short a time.
Load Sensed Timing avoids this problem.

INSTRUMENT LOADS
Most "Instrument" loads are of fairly large surface-area/mass ratio, and will heat up quickly following the chamber temperature closely without the need for load sensed timing.

BOTTLED-FLUID LOADS (Liquids)
These are of high mass , small area and suffer from the slower heat-up . Load Sensed Timing is entirely suitable, and extremely effective in reducing this problem.

WASTE DESTRUCT LOADS
These are best used Without Load Sensed Timing. The Profile should provide sufficient tolerance to ensure the cycle specification is achieved.

SELECTING
If installed and configured, then Load sensed Timing may be selected for each Cycle.

A suitable LOAD TEMPERATURE (threshold temperature) is set in the STERILISE STAGE PARAMETERS (in addition to the Sterilise Temp.)
Once the chamber has achieved the Steriklising Temperature but the Load is still heating to this temperature, then this Threshold is compared with the Temperature measured by the LOAD SENSING PROBE ,(the flexible wandering probe placed within the load).

When the "Sensed" temperature in the load rises above the Threshold the Sterilising Stage Timer System is started and the Display changes to show "STERILISING" .

If Load Sensed Timing is not required set the "LOAD TEMPERATURE" to 0.0C

<div style="background-color:yellow">

IMPORTANT

If correctly positioned the LOAD SENSING PROBE detects the actual temperature within the LOAD and so will ensure that the load experiences the set conditions for the set time,

There is no need to compromise or extend times to allow for the load to catch-up in temperature with the chamber.

</div>

SPECIAL LOAD SENSORS
The Load sensor provided with this system is normally a 6mm Dia flexible type thermocouple but some models use PT100 sensors instead This may be too stiff or solid to use for some delicate loads.

In this case Alternative probes May be available. Please consult Service dept. or your dealer

COOLING LOCKS & LOAD SENSING

Programmed Cooling Temperature
Setting a Cycle Cycle up with LOAD SENSED TIMING in a LIQUID or WASTE DESTRUCT Cycle also requires a LOAD SENSED COOLING LOCK function for that Cycle . In this case the COOLING LOCK senses and acts upon the actual Load temperature

This is done by setting the required Cooling Temperature (ie safe to open door) in the Load Sensor setting in the COOLING stage of the Cycle

The Cooling Stages operate in the same way but the "COMPLETE" stage cannot be reached until the LOAD SENSING PROBE, and so the LOAD, has cooled to a temperature below the LOAD COOLING TEMPERATURE set for that Cycle.

COOLING LOCK THERMOSTAT
Temperature of the chamber "wall" must be below the setting on the COOLING LOCK THERMOSTAT
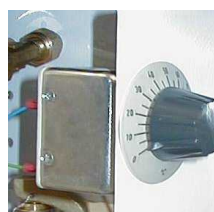
Typical View of Cooling Lock Thermostat

LOAD TEMPERATURE DISPLAY

For any Cycle where you require Load Sensed Timing, selected by setting an appropriate **LOAD TEMPERATURE** in the Sterilise Stage of "Cycle Settings" (Note that the Load sensor option must be fitted and Load Sensor input must be properly configured for use-.)

The Load Temperature is then displayed together with Chamber temperature and Pressure.
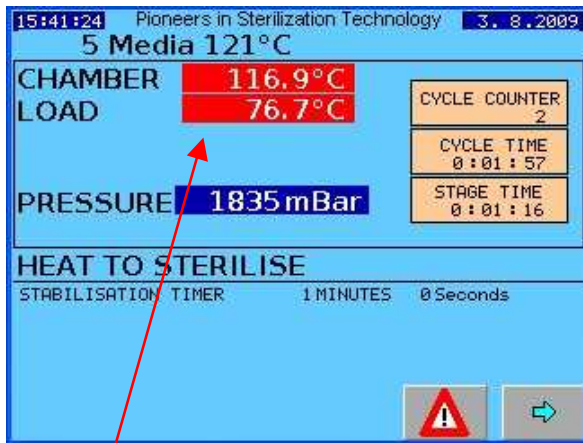
LOAD TEMP is displayed , if Load Sensing is set up and selected in cycle parameters.

Note;- if a cycle without load sensed timing is selected, after running one which used load sensed timing then the "Load Temperature" display may not disappear until the cycle has started – and visa versa .

SETTING And MODIFYING CYCLES

MODIFYING A CYCLE

Each cycle comprises a number of stages
Example-

- PreVacuum
- Negative Pulses (optional)
- Positive Pulses (optional)
- Heating – (to generate steam)
- Heating to Sterilise
- Sterilise stabilization
- Sterilise Timed period
- Cooling- or- Drying
- Airbreak
- Complete

Press the Button
for MAIN MENU

Select " SETTINGS MENU"

SETTINGS MENU

Login with your Username and Password

Select CUSTOMER CYCLE EDIT

Note-

Depending upon your security login level , eg User/Supervisor/engineer etc you may not see all the options shown above.

On the following screens the actual programs on the machine will differ from those in the illustrations

Also Depending upon machine specification etc ,
you may not see all the options shown above.
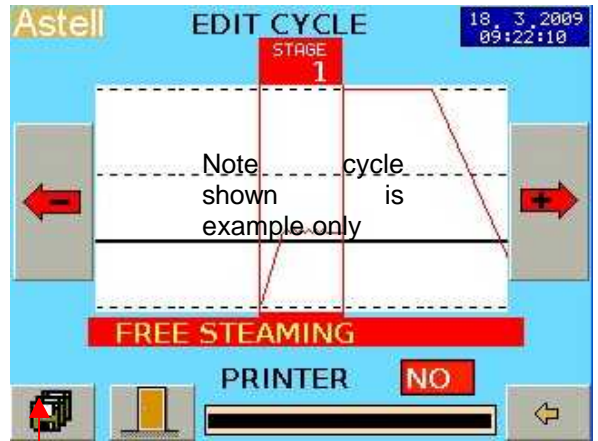
Press the FILE button to view available cycles

Use the ⬆️⬇️ buttons to move the pointer to the chosen Cycle. (here "Glassware")

Then press the **FILE OPEN** button to open that cycle ..

Cycle name shows here

Press the buttons ⬅️➡️ to move to Stage 1.
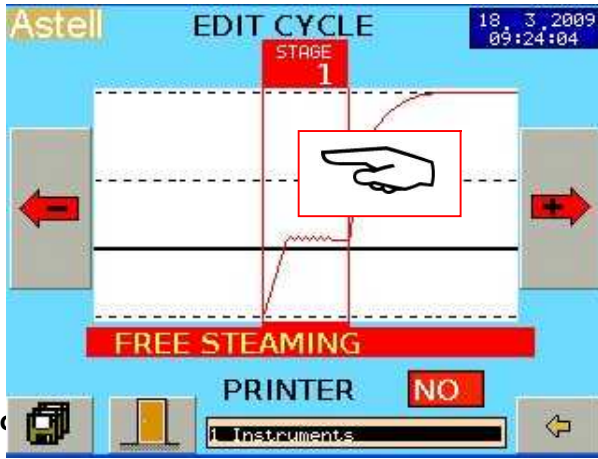
This opens the PARAMETERS for that stage

We can now enter or edit the parameters for The Heatup & Freesteam Stage

Touch the NUMBER of the parameter to change (ie above for MONITOR TIME touch the "60min" **)**

The Numeric keyboard appears

Type the Parameter Value you want

Then press **[✓]**

Note - for Hrs, Mins and seconds , you enter each part separately

Press to leave the parameter screen
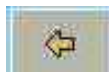
NOTE- actual parameters may vary- please see separate section detailing parameter values.
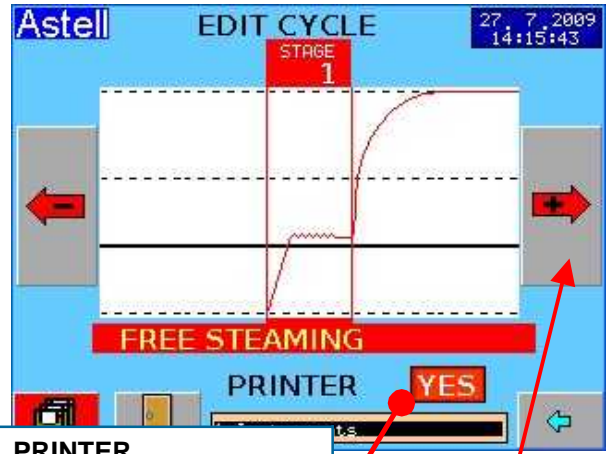
PRINTER
if a Printer option is fitted You can set it to print during this stage by setting this button to Yes

Press Red Arrow to move to next stage
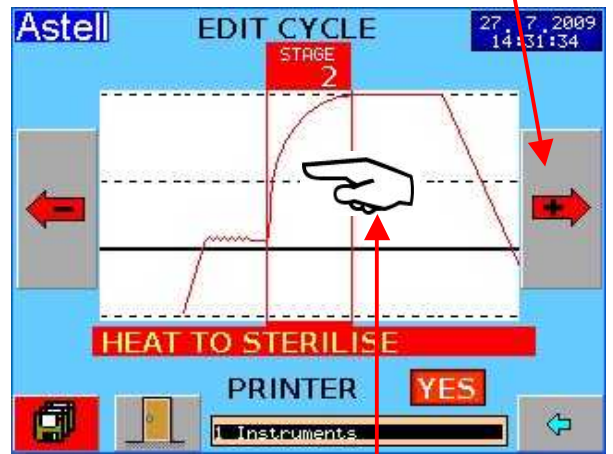
Touch the centre of the screen

You set each of the parameters , using the Numeric Pad , just as for the previous stage

The Procedure is the same for all Stages;-
- **Use arrows to select stage**
- **Touch centre of screen**
- **Select and enter parameter**
- **Select parameter and touch it to edit it**
- **Type in value**

Press ✓and go to next stage

SAVING THE MODIFIED CYCLE

Each Cycle has a name.

A   You may save the cycle as one already present – (this will overwrite the original)
Or
B   You may save it as a new cycle , allocate this a new NAME and save that.

A   SAVE AS THE CURRENT SELECTED CYCLE

Note- To Save the modified values you need to press The FILE SYSTEM button;-

Then press the "FILE SAVE" button

B   TO SAVE AS A NEW CYCLE

press The **FILE SYSTEM** button;-

Scroll down to a blank space on the list
Then Touch the   Black " TITLE BAR "
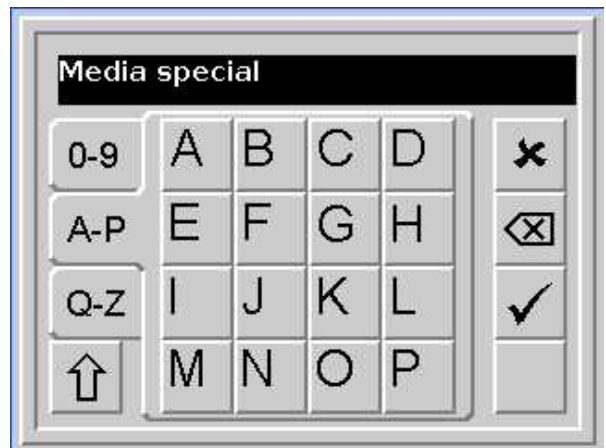
Key in the new TITLE & press [✓] –
here we used "Media Special"

Then press the "SAVE" button

DELETE A CYCLE

**To Delete a cycle, go to the
 "CURRENT CYCLE" page**

Choose the Cycle you wish to delete

**It is advisable to double-check that this really is
the one to be deleted.**

Press Delete

**If you are sure
you want to
delete it, click
on the**

✓

CYCLE BACKUP

Warning!! Over-writing Cycles .

**It is especially important that you do not
overwrite or delete the SAFETY VALVE TEST
CYCLE.**

**It is a common error that the Cycle you are
trying to save is saved accidentally on top of an
existing Cycle that is needed.**

There is no UNDO or UNDELETE command so
once done it cannot be simply undone.

A backup of the originals is useful so you can go
back to the original situation.

So - Before you make any major changes it is a
good idea to back up your existing Cycles to a USB
stick. To do this backup the "Customer Cycles" as
explained later in this section.

CREATING NEW CYCLES

The Create new cycles option allows an engineer to create cycles specific to their exact load requirements. The create cycles section only creates the shell of the cycle i.e. stages. The specific stage parameters are adjusted in the edit cycles section covered later in this manual.

Creating a New Cycle
When the create cycles button is pressed the following screen will be displayed
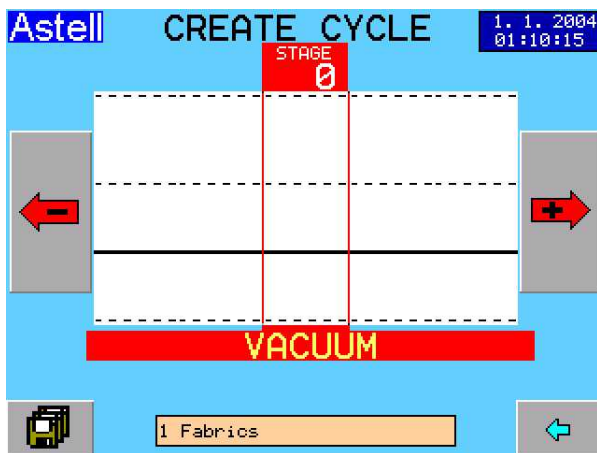
Press the " 3 disk" icon

The screen below will be displayed.

Note that not all cycles shown here will be available.
Select one of the factory set cycles to use as a "template" by using the up and down arrows and pressing the open File button

Then press the BACK button

The different stages of the cycle can now be added & removed,
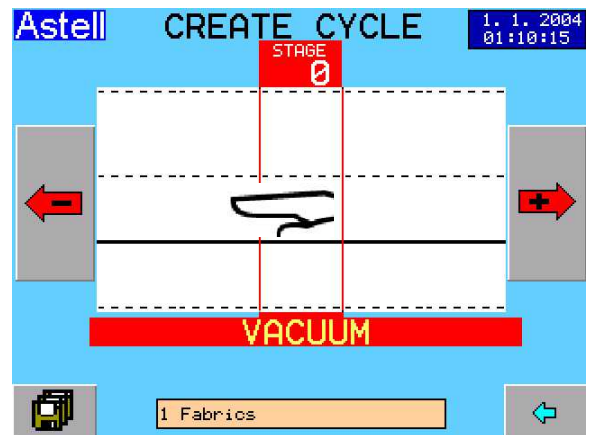
Touch the   screen

A screen will open listing stage options e.g. Vacuum, Negative Pulsing etc. Select the required stage by pressing the corresponding arrow,

There is a second screen accessed by the [More Options] button with additional stages and the following editing control functions;-

INSERT STAGE allows you toadd a new section between the current stage and next.

DELETE STAGE deletes the current stage,

CLEAR CYCLE clears the whole cycle

As with Editing Cycles use the left and right arrows) To move between stages.

ENTERING PRAMETERS
 When you have created a cycle and saved it you then go to it as CUSTOMER CYCLE EDIT and enter the parameter values.

If you get lost whilst creating a cycle you can clear the cycle by selecting "clear cycle" and start from scratch

---

.

NAME / RENAME A CYCLE
The cycle can be renamed, whilst in this menu
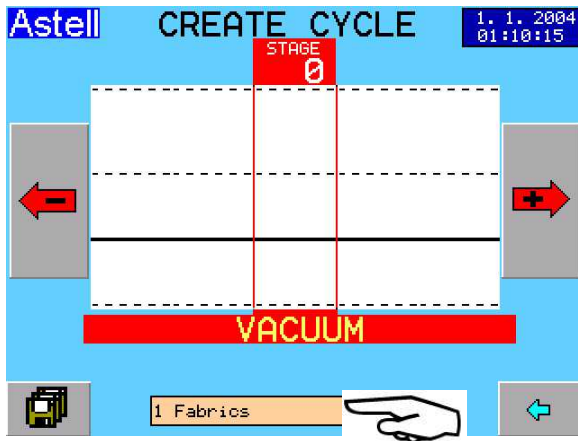
Touch the beige **TITLE** box at the bottom

The alphanumeric keypad will appear automatically.

Enter the desired **NAME**

SAVE CYCLE
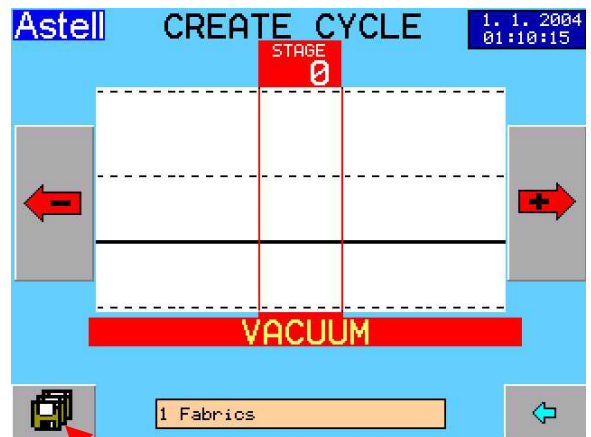
To save the new cycle press the 3 Disk icon to enter the cycle select screen

WARNING
Before Saving…MAKE SURE that the highlighted cycle is the NEW one – if you accidentally select an existing cycle then this will be overwritten by the new cycle and is difficult to restore

Press the single disk icon.

Your cycle has now been created and saved to memory]

Now go to CUSTOMER CYCLE EDIT select the Cycle and enter the parameter values.

SETTINGS MENU- CONT..

EDIT MACHINE SETTINGS

OPTIONS

USER LOGGING   Yes/No
Select user logging

PRINTER   Yes/No
Selects Printing Functions.

START   START / END
Selects Printing throughout cycle(START)
Or
Printing at END of CYCLE (End)

CHART RECORDER
Selects auto control of a chart recorder

BAR CODER
Selects input from a Bar Coder

BATCH NUMBER
Selects User input of Batch Number at start

LOAD NUMBER
Selects User input of Load Number at start

DELAY START Yes/No
Selects Delayed Start option.

MACHINE PARAMETERS

SAFETY TEST CYCLE

SET PRESSURE
This is the pressure that the machine will aim for &
TRY to achieve - this will not actually be achieved
since the safety valve will operate first

REQ. TEST FREQUENCY
Period between safety valve tests
A Max of   90 days is recommended by Astell
Scientific and most safety inspection regimes..

SET TIME AND DATE

Astell SET DATE & TIME

DAY : **18**

MONTH : 3

YEAR : 2009

HOUR : 9

MINUTE : 33

SECONDS: 44

18.03.09 09:33:49

F... C...
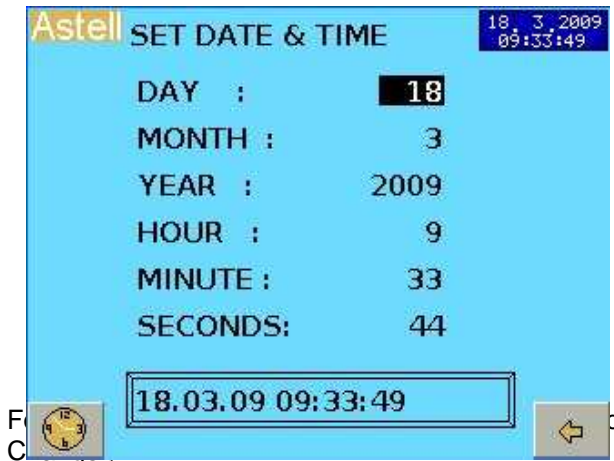
Touch the Figure on the screen**. – eg [18]**

Type in new figures on the Numeric Keyboard
Then press [✔]

When you are happy with the Date and Time
shown Press the Time Set Button
To save the changes.

CALIBRATION

Astell MACHINE CALIBRATION

➡ CALIBRATE CHAMBER
➡ CALIBRATE LOAD

➡ CALIBRATE PRESSURE

Please note that the sensors on your machine may include other sensors that not shown in the example above

Please see CALIBRATION MANUAL MXN785

CUSTOMER DETAILS

This holds CUSTOMER DETAILS
There are several lines for Name Address, Machine Type, Serial No etc
CONTACT DETAILS-
ie Supplier or Astell Scientific Factory address.

To edit any of these touch the line , then enter the characters using the alphanumeric keypad as already described

SYSTEM SETTINGS

Astell MACHINE SYSTEM SETTINGS

➡ TEMPERATURE PROBES
➡ PRESSURE
➡ DOOR MODE/HOLD WARM
➡ POWER FAIL MODE
➡ ENABLE MASTER PASSWORD
➡ CALIBRATE TOUCH SCREEN

USB BACKUP - RESTORE

Astell

BACKUP   RESTORE

➡ CfgData   ➡
➡ CycleTypes   ➡
➡ CustomerCycles   ➡
➡ Log   ➡

Ready - Waiting for required action.

This allows the Backup of the Cycles, calibration, & all other settings onto a USB Flash Disk

To Backup PRESS   **BACKUP ➡**

CFGdata backs up the configuration
Cycletypes backs up the cycle type settings
Customercycles backs up the cycle parameters
LOG backs up the onboard Logging

TO Restore PRESS   **RESTORE ➡**

CFGdata restores the configuration
Cycletypes restores the cycle type settings
Customercycles restores the cycle parameters
LOG restores the onboard Logging

Warning- RESTORE will overwrite any existing data which cannot then be retrieved.

SAFETY VALVE TEST - SELECTING

The **SAFETY VALVE TEST** button toggles between Red and Green;-
    Red   -- Normal (no Test Cycle available)
    Green – Safety Valve Test Cycle **available**

When "Yes"/ **Green** The Safety valve test Cycle shows on the SELECT CYCLE list of program as in the example below
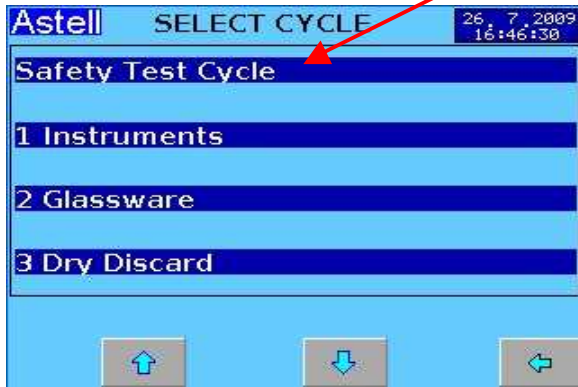
I/O OVERRIDE

Engineer Levels Only
This facility allows an engineer to view and contol Inputs and control the outputs manually. This could be hazardous and should only be done by a competent person.

The **DIGITAL INPUT 1 & 2 DISPLAYS** show the state of the inputs ie switches, sensors etc

The On or OFF state of the inputs is shown by the small squares.

   = OFF
            = ON
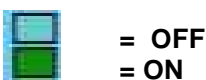
To select the other pages of I/O

Inputs 2

Outputs 1

Outputs 2

Analog Inputs
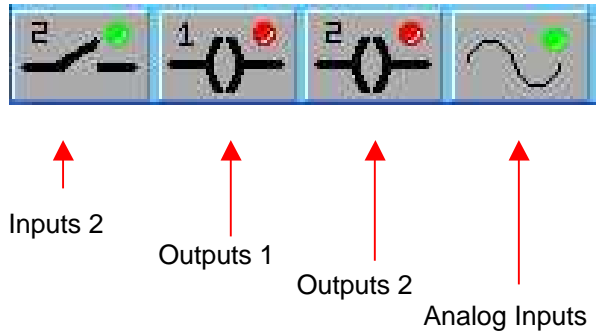
The "**OUTPUTS 1 & OUTPUTS 2"**   display shows the current state of the machine outputs - ie relays or actuators etc.

Output state is shown by the small squares

   = Output OFF
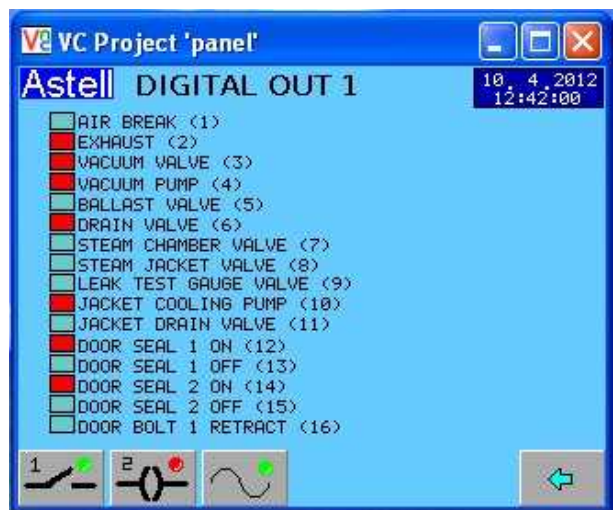
    = Output ON

MANUAL CHANGE OUTPUTS
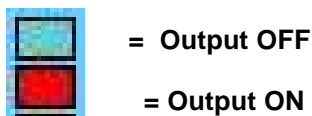
Select the output to change by moving the red arrow

You can do this with a stylus on the touchscreen or using the Up/Down arrow buttons
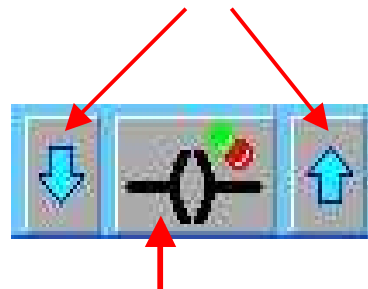
To change the state of the selected output press the middle button

The Small Square indicator changes to have a Yellow Triangle to show it is manually controlled.
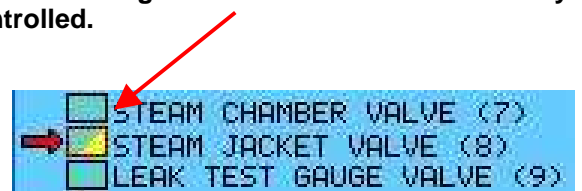
The rest of the Square shows the current state

   = OFF + MANUAL

   = ON + MANUAL
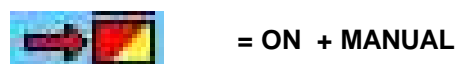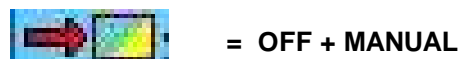
PRINTING CYCLE DATA

PRINT CURRENT CYCLE
This will print out the most recent Cycle

PRINT MACHINE SETUP
This will print out complete machine setup- you may need to print this for Service Requests.

LOG HISTORY PRINTING
Prints saved Cycle Records

Use the Coarse and Fine arrow buttons
To highlight the desired Record.
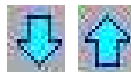
Press File Open button to load a record

Press the PRINT# button to print
The selected record

The Log-Dates button will re-organise
the list after a restore operations ,etc

PRINTER INDEPENDANCE
Please note that the fitted printer is not independent & has no separate sensors or intelligence – it records from the control sensors and prints the same data as available on the display..

If your QA requirements dictate that the printer gives a totally independent readout and record of measurements Please consult your Agent or Astell Scientific. A range of independent printing solutions are available that work together with these models.

DATA PRINT OUT

Printout is automatic whenever it is set in the Customer Cycle etc

START / END PRINTING selection
(in "Machine settings")
in "MACHINE SETTINGS" menu;-

If the PRINTING function is set to **[START]**
Cycle Progress is printed automatically as the cycle runs
If this is set to **[END}** the complete set of data is stored and printed after the cycle completes.

In "CUSTOMER CYCLE EDIT" select "YES" in the "PRINTER" box for each of the Cycle Stages where you want the Printout
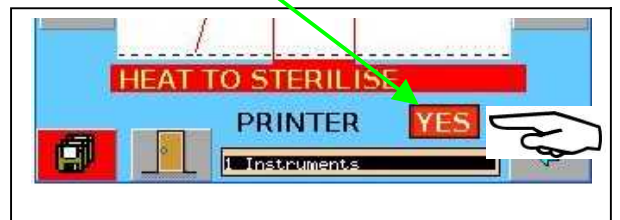
Information Printed-
All relevant events such as;-
Start information, Cycle selected, Cycle details,
Temperatures pressures & Times etc
Cycle No , Stage, Completion details and Time etc
Manual Stage Changes or operator intervention
& Faults if & when they occur

MAIN SETTINGS MENU

HELP/TUTORIALS

This has a set of onscreen slideshow - type demonstrations of how to perform some of the usual tasks. Select the tutorial and use the arrow buttons to step through the demonstrations.
To exit press the "BACK" button

VIEW IO

This section allows you to inspect the inputs and outputs for service use. These are normally Engineer level items however You may be asked to look at and report on these in the event of a service request.

This shows the digital inputs and the outputs for the system.

This item is covered in full in the "IO OVERRIDE" section elsewhere in this manual..

SYSTEM INFO

Screen Contrast

On System Info Page (see above)

      Press + or- to change the screen contrast

LANGUAGE

The default language is currently UK English. Foreign language versions are not available.

TOUCHSCREEN CALIBRATION

See the section on this elsewhere in this manual.

FAULTS AND ALARMS

If any of the functions monitored for faults are triggered then the system will ensure that a safe condition is generated.

This may stop the cycle early and then go to " CYCLE COMPLETE - FAILED "

The ALARM button FLASHES RED

Press the ALARM button
For the ALARM LIST

Login with your Username and Password

The example below is for the case where the most recent fault is the door is detected as **Not Bolted (during a cycle.)**

Check the cause of the problem has gone, or identify and Remove it

Then press **ACK** Button to Clear Alarm

 ACK
Button Flashes
While Alarm is still
active

 Use the Arrow buttons
To select the desired
Alarm Record.

When the source of the Fault is gone & you press the ACK button , the button changes from Flashing to continuous GREY

Note

If the button will not change to GREY you have not removed the source of the alarm!

STERILISATION CYCLES NOTES & ADVICE

INSTRUMENT & GLASS CYCLES

INSTRUMENT CYCLES Suitable for processing Surgical or Dissection Instruments , Scissors, forceps and utensils that are suitable for Steam Sterilisation. Also suitable for small solid items, grilles, parts of Lab Cages, small trays, and solid objects.

GLASSWARE CYCLES suitable for sterilizing all types of empty glassware.

Note:- During Drying the items are subjected to Dry Heat at 130C or above. If the item cannot withstand this set Drying Time to ZERO.

LOADING
Please see general comments in Loading Section.
A variety of Trays and Racks are available for this machine.
With the Instrument-Tray Rack in place standard instrument trays (less lids) can be fitted into the purpose-designed runners. Polypropylene and Aluminium trays are available. It is desirable to use trays with perforated bases for optimal drying performance.
Place the instruments in the trays and fit the trays into the rack.

STERILIZE TIMES
Instrument Loads do not normally require an allowance for the time to heat-up as they follow the chamber temperature closely due to the large heated area..

In this case the Sterilise time may be set to the same as or a little longer than the desired "Sterilise Time" without allowing significant extra time for the load to heat-up.

Where a load is more complicated , heavier, and has thicker parts with significant thermal mass such as heavy utensils or glassware, an allowance is needed for the time taken for the load to catch up with the chamber temperature. Extra time should be added to the Sterilise time to compensate for this but the actual extra time can not be calculated. It must be determined by trial and error, or by setting a long time , and monitoring the actual load with a thermocouple thermometer.

FABRIC CYCLES

Fabric Cycles and Jackets
Proper Fabric cycles will leave the fabric load dry.
However please note that these cycles require a machine with full jacket and drying facilities.

Cycles normally use prevac, negative and positive pulsing

These loads require specific settings and arrangements and not all machines can sterilize them satisfactorily.

For   full advice on Fabric loads with any particular machine please contact Astell Service Dept.

FLUID & WASTE DESTRUCT CYCLES

FLUIDS OR LIQUID CYCLE
This is suitable for processing Media or other fluids etc in UNSEALED containers.

WASTE DESTRUCT Cycle
This is suitable for processing laboratory waste;- petri dishes, tubes, jars, bottles etc. These must be in a shallow open container and not sealed in a plastic bag.

FREESTEAM

LIQUIDS ;-
    On models below 80 Litres capacity Set the Freesteam period to 3-15 minutes.

WASTE DESTRUCT ;-
    Set the Freesteam period to 10-20 minutes ..
    On models of   80 Litres capacity and above you may need as long as 35 minutes.

LOAD SENSED TIMING
    Option- see Load Sensed Timing

Sterilise Time ;
    Set the Sterilise Time to the desired "exposure time". At the sterilise temp.

Allowance For Extra Time For Load To   Reach Sterilise Temp
    These Loads normally require an allowance for extra time for heat-up as they suffer from high thermal inertia .If the LOAD SENSED TIMING option is not used   an allowance is needed for the time taken for the load to catch up with the chamber temperature. Extra time should be added to the Sterilise time to compensate.

Sterilise Temperature;
    Set to the desired Sterilise Temperature .

COOLING
    The COOL1 or COOL2   must be set to determine the type of   cycle.

COOLING LOCK(S)
    Set to 80C for safety.-
    Please see SETTING UP AND COMMISSIONING SECTION

The Load Sensed Timing system detects the Load temperature , and automatically allows for the time-lag caused by the load delay in reaching sterilise temperature.

Set up the system as described above for the system Without Load Sensing, but with the following detail changes .
In STERILISE Stage Cycle Settings;-
a) Set the STERILISE TIME to the Actual STERILISE TIME.(no extra allowance heat up)
b) Set the LOAD TEMPERATURE to about 1-2 C below the sterilise temperature

When the load reaches set Load Temperature the Stabilise time will begin , followed by theSterilizing Timer starting , and the cycle will proceed. (It is not necessary to note down any value or time .)

MEDIA HOLDWARM

If Media Holdwarm is required at the end of the cycle, then 'HOLDWARM' should be set to ON in the Cycle..

The Holdwarm system is designed to allow sterilisation of MEDIA loads ,with a holding stage during the cooling process that maintains the temperature of the load and chamber warm enough to permit pouring of the melted media. The media will be kept warm for up to 48 Hrs . The Autoclave may be set to operate overnight with a Media Load, in the knowledge that it will contain a useable load when opened in the morning…. or later in the day

"Holdwarm" takes place   between COOLING and COMPLETE

When the Complete Conditions are met as described above, if selected, the system goes instead to the HOLDWARM stage

COOLING LOCKS

The Cooling Locks are disabled for Instrument and Glassware Cycles

Cooling locks are there to prevent the operator from opening the chamber and removing the load when it would be at too high a temperature for safe hanling. Typically this is 80C.

For models without Load Sensing, during cooling inside the chamber, the load cools slower than the chamber temperature and gives up heat to the chamber walls. This means that the chamber will reach 80C before the load so in practice (unless load sensed timing is fitted + turned on) the cooling lock setting will need to be BELOW the temperature at which the load is safe to handle.

The cooling lock temperatures are best measured and then set as parameters, using a thermocouple (t/c) and digital thermometer with the t/c sealed inside the chamber through the removable Thermocouple Port in the chamber wall , with the end immersed in the container of the load . This is normally carried out by a service or commissioning engineer requiring use of a Thermocouple entry adaptor.

It is possible to set the Cooling lock without a thermocouple but this cannot be recommended. A laboratory thermometer reading to 100C is required.

Load the chamber with the desired load, and make a first approximation of cooling lock temperatures . 80C is suggested for both the Cycle "Cooling Temperature" and the Preset cooling Lock Thermostat settings. Start the cycle and allow it to complete. Very Carefully remove the load, using insulating gauntlets and suitable face protection in case the load is too hot. Immediately measure the temperature of the liquid in the load container that was nearest the centre.

Record this temperature and compare it with the desired opening temperature (80C suggested).

The measured load temp. is likely to be higher than the desired temperature. Adjust the Cycle and Preset settings as required and repeat the cycle with the same load, measure and re-adjust if required. Continue until the desired Cooling Lock release temperature is achieved.

COOLING   LOCKS   & LOAD   SENSED   TIMING

Programmed Cooling Temperature
Setting a Cycle up with LOAD SENSED TIMING in a LIQUID or WASTE DESTRUCT Cycle also requires a LOAD SENSED COOLING LOCK function for that Cycle . In this case the "COOLING

LOCK" senses and acts upon the actual Load temperature as measured by the Load Probe.

This is done by setting the required "Cooling Temperature" in the "Load Sensor" parameter in the COOLING stage of the Cycle

There is not any need to measure load temperatures to set this system up- because the controller is doing it for you.
Just set the Load Temperature to the desired Cooling lock setting (eg 80C).

COOLING LOCK THERMOSTAT
This is the second of the cooling interlocks.

You can set the dial on this thermostat to the desired Cooling Lock release temperature . This will give correct operation but will not provide good second-level safety for the operator if the Load sensor fails or is misplaced.

Whilst cooling down the temperature of the chamber "wall" will be below the temperature inside the load. The Cooling Lock Thermostat senses the chamber wall.

Since this is the "backup" cooling lock system, it should ideally be set to operate to a representative temperature for the load,

Optimising Setting

With the rest of the cycle parameters defined and set in the cycle Set the dial to 20C
Load the chamber and Start and run the cycle.

During the cooling observe the Load Temperature. as this falls towards the desired temaperature (eg 80C). When it drops below this temperature , slowly rotate the knob and dial of the Thermostat Clockwise to increase the setting.

At some point- typically between 40 and 70C for 80C cooling lock temperature - the Cooling lock thermostat will operate and the system will move on to the next stage. Leave the thermostat Knob at that setting and record it with any notes you have on the Cycle Parameters etc.

This setting will then release the Cooling Lock Thermostat just before the load sensor reaches the set Cooling temp.

Typical View of Cooling Lock Thermostat

STERILISE TEMPERATURE & TIME

Selecting A Suitable Sterilise
Temperature & Time

The U.K. Medical Research Council recommended the following time/temperature relationships for the achievement of sterilizing conditions:-

Minimum Sterilise Temperature	Maximum Sterilise Temperature	Minimum Sterilise Hold Time
134	138	3 min
126	129	10 min
121	124	15 min
115	118	30 min

Lower temperatures or shorter times may have to be used to prevent degradation of bacterial growth media. This may be adequate for culture purposes , but does may not constitute full sterilisation. The manufacturer of the media will usually specify the sterilizing temperature.

Temperature Tolerance
Please note that during sterilizing the temperature will normally cycle up and down over a range of approx +/- 0.7C around the set sterilise temperature. Where temperature is specified as "-0 +??" adjust the temperature as shown here.

Specified Settings	Pressure Setting	Temperature Setting
134C -0+4 3 mins		135C or 136C
126C -0+3 10 mins		128C 10 mins
121C -0+3 15 mins		123C or 122C 15 mins
115C-0+3 30 mins		116C 30 mins

OPTIONAL   PRINTERS

Three types of Printer are available

A INTERNAL STANDARD PRINTER OPTION
Please see instructions below

B EXTERNAL STANDARD PRINTER OPTION

C EXTERNAL User-supplied Rs232

B & C - Please see separate manual(s) for external
printer or RS232 Communications option

INTERNAL PRINTER OPTION

The printer is mounted on the Front face of the
machine. The standard printer supplied is   the
Astell "Clamshell-Load" Type Shown above .
This is a 40 character easy-load dot-matrix impact
printer which prints on 58mm wide plain roll paper.
It uses a replaceable ink ribbon cartridge and prints
in one single colour (Black)

INSTALLING REPLACEMENT PAPER

Open the "Clamshell" front panel,

Remove the   old Paper Roll.

Cut off the end of the new paper
 cleanly with scissors

Feed the cut edge of paper into
the printer mechanism and
operate the PAPER FEED button.

Paper Roll Path
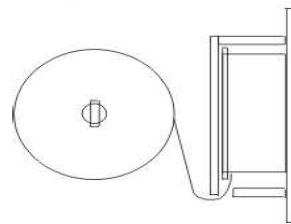
For best operation use only Astell Scientific
Supplied paper and ribbons.

Incorrect loading causes many expensive service
call-outs. Please ensure that the paper loading
method   described here is used . Do not tear-
always cut the paper with a sharp pair of scissors- a
likely cause of problems is the introduction of paper
fragments produced when paper is torn.

CHANGING PRINTER RIBBON

First remove paper from the printer.

Open the Printer Front panel.

The Printer Ribbon is the small black L-shaped
cassette that sits below the paper out slot.

Grasp at both ends and pull firmly away from the
printer assy.

To fit the new ribbon

Hold the new Ribbon Cassette by the ends and
rotate the small wheel using the tip of a Biro Pen in
the direction shown by the arrow on the cassette.
This tensions the ribbon.

Place the New Ribbon Cassette in position on the
mechanism. Press the Larger end with the Wheel
down gently until the clutch engages then press the
other end down until seated correctly. The ribbon
should fit neatly into the slot provided without any
twists.   If   not   remove   and   refit.

Press "PAPER FEED " button on top front of printer for 5-10 seconds to align the ribbon in the slot. Open front LOWER panel and check ribbon - The ribbon should run neatly in the slot provided. If the ribbon is distorted and above the slot, remove & re-tension the ribbon and repeat the fitting.

Fit paper as described above.
Maake sure paper roll is free to rotate and Close top and bottom of case.

OPERATION OF PRINTER

Please note that the print is not visible immediately after printing since the point at which the printing occurs is a few mm inside the case & out of view.

Printing is automatic whenever it has been set to take place within the Cycle . .

Cycle Progress is printed automatically as the cycle runs, [Or at the end of the cycle depending on how printing is set up.]

The printer can also be used to print reports etc.

PRINTER SPARE PARTS

**Paper
(Per 58 mm Roll)**

   Astell Part No   SXP374

Ribbon cartridge

   Astell Part No SXP373

Printer PROBLEMS

Most Printer Faults are due to the paper or ribbon being incorrectly installed or use of incorrect paper or ribbons.

PRINTING VERY FEINT
Replace Printer Ribbon

CENTRE OF PRINT BLURRED OR MISSING
Ribbon incorrectly installed with ribbon out of slot in centre

PAPER WILL NOT LOAD
The Paper end MUST be cut cleanly at the end or it may tear , jam, and clog the printer mechanism Ensure paper roll is fitted correct way up.

RIBBON
Ribbons must be fitted with the ribbon correctly seated in the slot. If the printing becomes faint replace ribbon.

OVERSIZE PAPER
use only Astell-supplied or Astell- approved paper. Alternatives may appear similar but poor paper quality will leave excessive dust which can damage printer or use up ink on ribbon too quickly.

Paper rolls purchased for Adding Machines and Tills are not suitable and are usually too large. They also tend to shed paper fragments into the mechanism and cause premature failures.

WARRANTY
Installation of paper to the printer is outside the manufacturers control. Service calls during the warranty period which (in view of the manufacturer or agent) are caused by the incorrect type, use or fitting of paper or ribbon , may incur service charges.

RS232 COMMUNICATIONS OPTION

This provides 1-way communications only. The Controller outputs data but accepts no data or instructions from the computer system, The text output that would normally go to the printer is fed to a Comms. serial input on a computer. The data will be exactly the same as the data printed by the internal printer option. Ie; printout of Cycles during or after the cycle , and download of Archived Cycles etc. The output is plain text & is NOT formatted for import into a spreadsheet.

Set for "Printing" as described earlier
The Serial port on the computer is preset to 9600 Baud 8 Bits No Parity 1 Stop Bit & the Connection lead is a standard 9 pin D type Serial Lead (Null Modem type),

On models with the Printer Option fitted as well as RS232 comms. There are two versions-

A   there is a small Toggle Switch on the machine - labelled " Printer" & "RS232". This routes the signal to the RS232 or the Printer. You cannot have both at the same time.

B   the connections are shared and only the data output is wired to the RS232 connector.

TO CAPTURE THE DATA

You can use Htyperterminal (part of Windows) or a similar terminal program for this..
Start Hyperterminal , and create a connection using the settings specified earlier. Save this connection with a suitable name for future use.

It would be useful to copy this to the Desktop.for easy access

In Windows XP these connections are stored in "*StartMenu\Programs\HyperTerminal Private Edition\HyperTerminal Connections*"

Open Hyperterminal with the Chosen connection.
a   on Transfer menu, select [Capture Text]

b   Enter the filename that you have chosen to save the data file.

c   Select [START] to start capture process .
The PC screen goes back to the hyperterminal window and you can see the text coming in.

When you have finished with the process of downloading text,

Go to Transfer menu, select [Capture Text] and then [STOP] to end capture.

d   The file will then be available to read etc.

e   You may select [Start] and leave the system running with Hyperterminal in the background as only the data normally printed during running cycles will be saved to the file. Nothing will be saved when the machine is off or not running so there is no risk of file sizes running out of control.

TOUCHSCREEN RECALIBRATION

PARTIAL DECALIBRATED SCREEN

The touch effect works on the screen but there is a position difference between the button and the sensitive part of the screen

If you can operate the screen but it is not quite right – proceed as follows

Log in as SITE ENGINEER
(code 333333 or above.)

Select ;- EDIT MACHINE SETTINGS
then PARAMETERS
then EDIT MACHINE PARAMETERS

Press "Re-Cal Touch Screen"
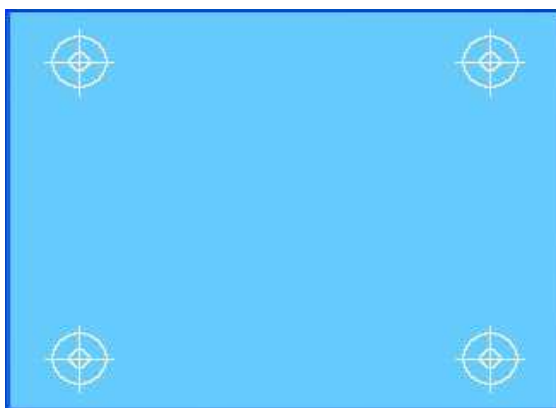
4 Targets appear on the screen one at a time

Using a softly pointed Stylus of some kind - Touch target(s) accurately in the centre as as they appear .

After touching the last target your screen has been recalibrated.

FULLY DECALIBRATED SCREEN

The screen displays but does not respond to touch effect anywhere on the screen.

You need to use a Remote VNC Computer connection to do this please see the section on installing VNC in this manual.

Run VNC , and log on with a password [2]
This allows you to control the screen by using a click on the computer mouse in place of a finger touch to navigate to the RE-CAL TUCHSCREEN item

Do this as shown on the left, but using the mouse in place of the faulty screen.

Once at the RECAL screen you must touch the 4 targets on the actual screen as explained on the left ie do not use the mouse for this.

You CANNOT use the mouse to click on the targets. As this will quit back to the last menu

ASTELL- VNC REMOTE CONTROL SETUP

A VNC link allows you to remote access the screen and controller via a computer   over an Ethernet system

Download the current version of   VNC (for example- version 5.03   = VNC-Viewer-5.0.3-Windows-32bit.exe or version 4 = vnc4_1_3-x86_win32.exe) Plug   Astell Controller into Computer Ethernet port using   a CROSSOVER ETHERNET CABLE and Start VNC viewer. software

Clear anything that may be in the " Server " box-

In the **SERVER** field Enter the IP Address and port no of the Controller
   For Astell Swiftlock Vacuum models this is

10.44.10.235
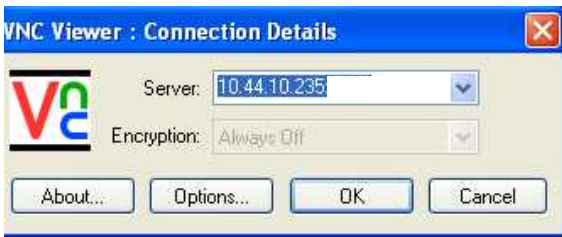
Click on OK

The system will locate the Astell server and ask for the password—

To set for VIEWING ONLY
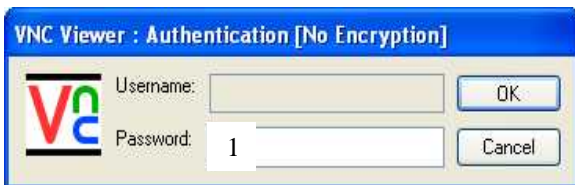
Enter ;- **1** for Viewing without Remote Control

Press OK- you are connected . Your PC will then display an image of .the Controller Screen identical to the actual screen.

TO set for REMOTE CONTROL
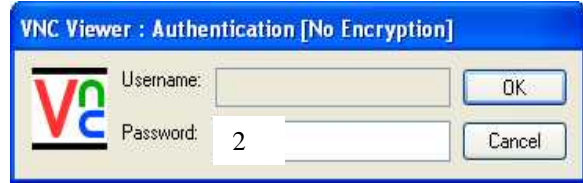
As above but ;-
Enter ;- **2** for full Remote Control

Press OK- you are connected . Your PC will then display an image of .the Controller Screen identical to the actual screen.

You will be able to use the Cursor arrow and mouse button in the same way as you use your finger on the touchscreen.

VNC and Windows 7

At the time of writing the FREEVNC 4 (vnc4_1_3-x86_win32.exe) software was unsupported on Windows   7 . It works well XP .

The solution is to purchase a license for the VNC   software . the Licensed version works on Windows 7.

For latest information on this matter please consult the Astell Service Dept.

PC SETUP IN WINDOWS XP/7
ETHERNET CABLE CONNECTION

You will usually need to set up your windows Ethernet Card to communicate with the controller.

This is because the controller has a fixed IP address and this will not be accessible by your PC unless you configure the Ip address for the PC to match.

Instructions are given here for XP
Windows 7 etc will be very similar *(with the same setting values but screens laid out differently.)*

Select "**NETWORK CONNECTIONS"**
(eg "Show all connections from Start menu)

Double-click on the network connection In use
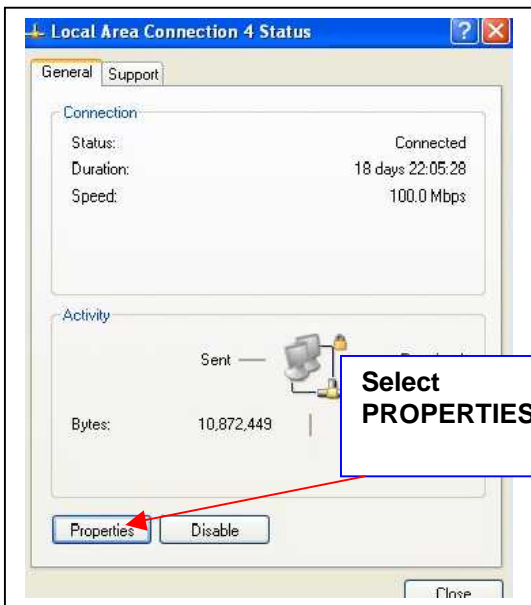
Select PROPERTIES
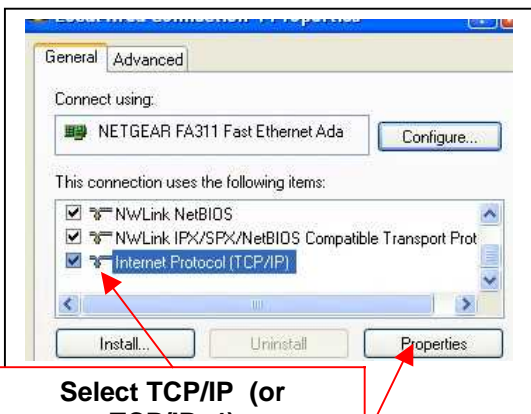
Select TCP/IP (or TCP/IPv4)
Click on Properties

Properties - Enter the values etc as below
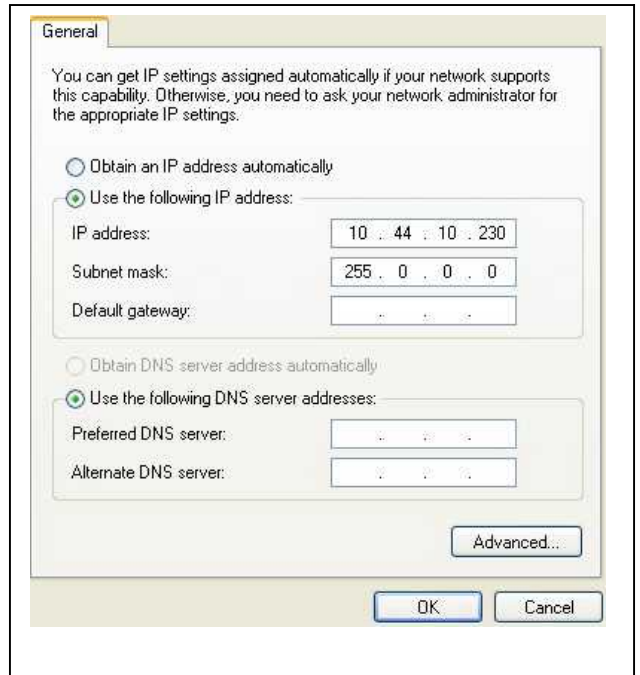
Click on the ● button = "Use the following address"

In The IP ADDRESS field=
Enter the same address as the one you used for VNC but change the last value by a few counts - eg 230 when using 235 on the VNC address

The Subnet Mask field should set itself as 255,0,0,0 If it does not do this, automatically enter these values.

Set the ● button = "Use the following DNS…"
Leave the DNS Server boxes blank

Click on **[OK]**

You should now be able to connect to the system using VNC as described in then last section.

STEAM GENERATOR
Disregard this section if your system has Direct Steam Heating

STEAM GENERATOR CONTROLS

POWER ISOLATOR SWITCH
Turns on power to the machine.
(May be shared with main machine)

FRONT PANEL CONTROLS
'HEAT' SWITCH
Turns on power supply to Heater system

'POWER' lamp
Shows power on to control system

'HEATING' Lamp #1
Shows power is on to Main Heaters

''HEATING' Lamp #2
Optional

'LOW WATER' Lamp
Shows water level is too low &Heating Shut down

'LOW WATER' Buzzer
(Optional-) audible alarm

GENERATOR PRESSURE. GAUGE
Dial Bourdon pressure gauge (Accuracy +/-1%)

OVER TEMPERATURE cutout .
This is sited behind the panel

STEAM Pressure SETPOINTControl
Controls operating point of Generator
This is sited behind the panel

BLOWDOWN/DRAIN valve
This is the hand valve accessed from the lower rear of the machine. The exhaust from this valve is directed into the main outlet drain. Or to a separate Blowdown Outlet pipe.

SAFETY VALVE
This is the safety Valve protecting the Generator.
It exhausts downward at the rear towards the floor.

Jacket Pressure
Chamber Pressure
Steam Generator Pressure
Main Power Isolator Switch
Steam Generator Controls
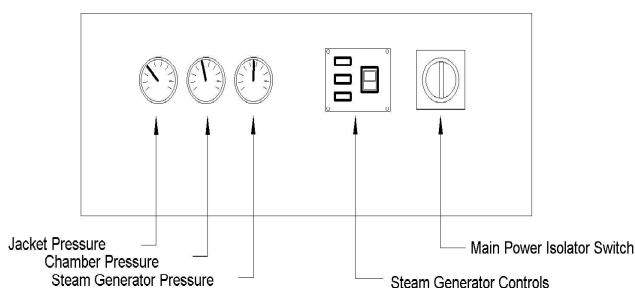
WATER SUPPLY

The quality of water will affect the operation and life of the elements.

Where hard water is used the elements will require frequent replacement or descaling

The water supply should ideally comply with the following specification;=

Total hardness $CaCo_3$	Max 2 p.p.m
Caustic alkalinity $CaCo_3$	Max 300 p.p.m
Total Dissolved solids	Max 2000 p.p.m
PH	8 –10

WATER SUPPLY CONNECTIONS

The water supply is drawn from the internal tank in the sterilizer. . If in a separate cabinet there will be a separate water inlet and tank system.

Drainage Connections

CONDENSATE
If built-in to the cabinet there is no separate condensate outlet- this is shared with the internal tank in the sterilizer and condensate eventually finds its way out of the main drain outlet.

BLOWDOWN
This controlled by is a manual valve fitted close to the generator. It is provided with an outlet pipe to permit blowing-down the generator.

1   COMBINED WITH MAIN DRAIN OUTLET
This is a 54 mm copper outlet pipe projecting from the rear of the STERILIZER .It must be plumbed into a building drain , and in normal daily operation carries water with a temperature of up to 60C
When the Steam Generator is blown down this requires that the drainage system can cope with water flashing to steam at or above 100C.
 Where the drainage system and regulations allow this arrangement then it is important that venting of the drain lines is adequate to avoid pressure building up in the drainage system.

Where required by regulations or site requirements the Generator drain may be separate from the main drain.- please see Steam Generator Manual.

  The outlet pipework should be free-draining and have a downward slope of a minimum. of 1- in 50 and should not be reduced in diameter. If the length

is to exceed 10 metres the whole of the length of drain pipework should be increased in diameter by at least one size.

2   SEPARATE GENERATOR BLOWDOWN

This is normally a ½" /15mm outlet from the drain/Blowdown valve. It is separate to keep blowdown steam away from the main drain. Arrangement of this outlet to a suitable drain is dependant upon local regulations. Typically It should be connected to a suitable blowdown tank or similar arrangement to permit safe discharge of high-temperature. pressurised contents. Care should be exercised to ensure that any such blowdown arrangement complies with all relevant building, safety, and insurance regulations.

IMPORTANT
If in any doubt about the regulatory requirements of the installation on this subject please consult Astell Scientific or your local agent.

STEAM PRESSURE CONTROL

The steam pressure is controlled by a single pressure switch mounted inside the sterilizer cabinet which is set to the desired pressure. The Differential is set to minimum.
This turns the heater contactor on and off. To maintain the set pressure.

Typical Set Pressure is 5.0 Bar

When the Main heaters are on the "HEATING" lamp is illuminated.

Boost System (optional)
The steam pressure during standby /control is controlled by a "Control" pressure switch mounted inside the sterilizer cabinet which is set to the desired running pressure. The Differential is set to minimum.
This turns the Main heater contactor on and off, to maintain the set pressure.
When the Main heaters are on the "HEATING" lamp #1 is illuminated.
The steam pressure during Heatup is controlled by a 'Heatup ' pressure switch which is set to a pressure slightly below the Control Pressure setting. The Differential is set to minimum.
This turns the BOOST heater contactor on and off. .
The effect is that during heatup the power is boosted , but just before control the Boost heaters turn off, and control is maintained on the main heaters only.
When the Main heaters are on the "HEATING" lamp #1 & "HEATING" lamp #2 are both illuminated.

OVERTEMPERATURE CONTROL
The system uses a HYDRAULIC THERMOSTAT(2 on Boost Heated models) set to about 225-250C with the Adjustment Knob sited inside the cabinet on the side of the Generatorheater Power Connection

Box . The thermostat has a sensor bulb mounted in a clip clamped above one of the Heater Elements. In the event of the water level falling low enough in the generator to expose the heater elements, the temperature of the heater will rise quickly and the thermostat bulb will operate opening the Thermostat contacts. This turns off power to the Heater system.

The standard arrangement is that the Overtemperature cutout is self-resetting. A system with a Manual-Reset cutout versions is available as an optional extra.

WATER LEVEL SENSORS

Water Level is controlled by two Float Switches and a pump up/down system.

When the water level is below the bottom limit the Float Switch makes & a Timer relay starts. After a few seconds (an anti-bounce control) the Feed-Pump turns on forcing water into the generator until Upper limit is reached & the Float switch turns off, when the pump stops.

If there is a problem and the water level falls too far the generator will run dry. A "LOW LEVEL" float switch will operate and shuts down the heaters and lights the "LOW WATER" lamp (and also sounds the buzzer alarm if fitted).

In combination with the Heater-mounted Over-temperature cutout this arrangement provides an effective low water fault protection system.

During start from completely dry the low water alarm will sound if the pump has sucked all the water out of the tank,(or if the feed pump period exceeds the timer setting.) This may happen if the water supply flow into the tank is too low

STARTING THE STEAM GENERATOR

NORMAL STARTUP-
WITH WATER PRESENT IN THE BOILER.

1   Ensure that the water supply is operating correctly .
2   Turn on the Sterilizer
3   Turn on the HEAT switch on the Steam-Generator control panel
4   The Low – Water lamp should not light.
5   The Feed pump may be heard to take on water. This is correct.
6   The heaters will turn ON and the Pressure will rise to the Control Pressure

WARNING

DO NOT RUN A CYCLE UNTIL THE STEAM PRESSURE HAS REACHED THE SET OPERATING PRESSURE..
{Eg approx 5 Bar}

DRY STARTUP-
WITH LOW OR NO WATER IN THE BOILER.

1   Ensure that the water supply is operating
        correctly .
2   Turn on the Sterilizer
3   Turn on the HEAT switch on the Steam-
        Generator control panel
4   The Feed pump may heard to take on water.
5   The Low – Water lamp will light and buzzer
        may sound
6   The LOW WATER lamp will turn off – Feed
        Pump continues.
7   The heaters will turn ON
8   Feed Pump stops
9   Temp.& Pressure will rise in the steam
        generator to the Control set Pressure

**DO NOT RUN A CYCLE UNTIL THE   STEAM
PRESSURE   HAS   REACHED   THE   SET
OPERATING PRESSURE.**

STEAM GENERATOR MAINTENANCE

The European PED and many similar regulatory
regimes require the user to set out and comply with
a formally agreed maintenance procedure. .

This information is provided in good faith to assist
this process but it is the user's responsibility to
ensure that all statutory regulations are complied
with.

BLOWDOWN
Carry out the Blowdown procedure as described at
the intervals agreed with your Service Agent or in
agreement with Astell Scientific.

WEEKLY
Check operation of Steam Generator safety valve
By operating handle on valve.

3-MONTHLY
Check operation of safety valve.as above
Carry out Blowdown procedure.

STEAM GENERATOR BLOW-DOWN

Blowdown is the process of blowing out a portion of
liquid boiler contents under partial pressure ,
intended to help reduce the build-up of sludge and
scale in the generator.

HOW OFTEN TO BLOWDOWN?
Typical blowdown frequencies range from 1 per
day to 1 per 20 days, depending upon site
conditions . Please consult the manufacturer for
advice.

WARNING ! Blowdown can be Hazardous

Before attempting Blowdown ensure that all
procedures and arrangements for a safe
Blowdown have been carried out,
particularly that the drainage system is safe
and designed to accept the steam and hot
water produced by the Blowdown.

As the performance of this task is outside
our control , Astell Scientific or its agents
cannot be responsible for any   loss or
damage caused by the user as a result of a
Blowdown operation.

1   Turn OFF the HEAT switch and allow
pressure to fall to approx 0.6 Bar (7-10 PSI)
  or
        Carry out Startup procedure and when
        pressure reaches approx 0.6 Bar (7-10 PSI)
        turn OFF 'HEAT' switch.

2   Open the BLOWDOWN VALVE for approx.
        5 seconds.
3   Close the BLOWDOWN VALVE
4   Turn ON the HEAT switch. This is then
        ready for normal operation.

Special BLOWOWN VESSELS are available to
safely capture the contents of the steam generator.
If your machine has one of these please consult
ASTELL for more detailed instructions.

WARNING
**It is not advisable to blow down from
above 0.6 bar .
it is very hazardous to blow down
from full operating pressure.**

STEAM-GENERATOR SAFETY VALVE TESTING

On installations where this discharges out onto the floor , keep away from the rear of the machine and warn people of the resulting noise.

Where discharge is outside ensure that no-one can be injured by steam escape and warn people of the resulting noise.

VALVE CLEARANCE - FUNCTIONAL TEST
Remove rear panel/sidepanel to gain access to safety valve on generator.- Consult Astell if not sure of where this valve is positioned.

Operate safety valve lever for 1-2 seconds.
Steam should discharge normally through safety valve outlet.

FULL OPERATIONAL TEST

Sterilizer Must Be on Standby/Ready, Ie;- NOT DURING A CYCLE:-

Remove rear panel and locate the CONTROL PRESSURE SWITCH for the generator.

Read pressure switch setting and Record for future resetting.

Adjust setting to above 6.5 Bar.

Allow pressure to rise. When pressure reaches between 6.0 - 6.5 Bar the safety-valve should vent steam.

& It should close again before 6.0 Bar

IF THE SAFETY VALVE DOES NOT OPEN & VENT AT THE STATED PRESSURE IT MUST BE CHECKED AND ADJUSTED BY A QUALIFIED ENGINEER.

Once the valve has operated correctly , Re-Adjust pressure switch setting to setting previously recorded.

Allow to Cool to normal set pressure

Check that Steam Generator returns to control at the normal pressure.

Do NOT operate the machine until the Steam Pressure is at the normal operating setting

DOOR SAFETY PRESSURE SWITCH SETTING & TESTING

The Door safety Pressure switch test is designed to check that the door interlock pressure switch is not set incorrectly which will cause problems or a hazard

 Proceed as follows;-

1   locate the door interlock pressure switch. This looks like the pictures here.

2   Turn on the power.
3   . Log on as Site engineer   and go to "VIEW IO"
4   Look at the PRESSURE SWITCH in "VIEW IO"

If there is NO PRESSURE in the chamber this SHOULD read "ON"
 (ie it will read ON at atmospheric pressure)

If it reads ON then this is OK.

If it reads OFF then continue as below.

5   look at the pressure switch- you will see a round black plastic toothed wheel that you can adjust by rotating. turning it clockwise increases the operating point

6   Rotate the wheel slowly one notch at a time in a CLOCKWISE direction to increase the switching pressure until VIEW IO display changes to ON . On the switch the contacts have changed over . [You may not have to adjust far- this will probably be just part of a turn.]

Be slow and careful because we need the setting to be the point at which the contacts have *"just"* changed to ON

 If you wish to check the new setting disconnect the switch from the   pipe and apply a small pressure to the switch- if you have good lungs a short thin pvc tube pushed onto the switch will allow you to inject air – eg from a syringe into it to test it. Do not blow directly into the switch.

STAGE PARAMETERS EXPLANATION

PARAMETER	DESCRIPTION
Print Interval(all stages)	This is the time between individual printouts of parameters

PREVACUUM

Monitor time	This is the maximum time that would be allowed in this stage if something went wrong with the timing, before a FAULT is triggered. Must be greater than the HOLD TIME.
Hold time	This is the time that the Prevacuum is held for
Set Presssure	This is the set PREVACUUM pressure
Drain Valve	This decides whether the Drain valve is On or off is
Jacket Pressure	Na

NEGATIVE PULSING

Monitor time	This is the maximum in stage before a FAULT is triggered.
Dwell time	Time at low pressure
Set Presssure HI	Pressure pulse maximum
Set Presssure LO	Pressure pulse minimum
Pulse Count	No of pulses
Drain Valve	Drain valve open or closed
Jacket	Set Jacket Pressure

LEAK TEST

Monitor time	This is the maximum in stage before a FAULT is triggered.
Hold time	The length of time the stage will continue to pull a vacuum once the pressure has been reached.
Timer 1 Leak Test Stabilisation	**Time for this stage**
Timer 2 Leak Test	**Time for this stage**
Pressure Loss	Pressure Loss maximum allowable
Set Presssure	Pressure Target
Pulse Count	No of pulses
Drain Valve	Drain valve open or closed
Jacket Pressure	Set Jacket Pressure

AIR DETECTOR TEST

Monitor Time	**THIS IS THE MAXIMUM IN STAGE BEFORE A FAULT IS TRIGGERED.**
Set Pressure	Pressure for Low/High level air detector check
Set temperature	Set Temperature
Drain Valve	Drain valve open or closed
Jacket Pressure	Set Jacket Pressure

POSITIVE PULSING

Monitor time	This is the maximum in stage before a FAULT is triggered.
Dwell time	Time at low pressure
Set Presssure HI	Pressure pulse maximum
Set Presssure LO	Pressure pulse minimum
Pulse Count	No of pulses
Drain Valve	Drain valve open or closed
Jacket	Set Jacket Pressure

FREESTEAM

Monitor time	This is the maximum time that would be allowed in this stage if something went wrong with the timing, before a FAULT is triggered. Must be greater than the HOLD TIME.
Hold time	**This is the actual FREESTEAM/FREESTEAM TIME** Practical values range from 3 to 20 minutes depending on the model and the load

PARAMETER	DESCRIPTION
Freesteam/cont.	
Set Presssure	Pressure during Freesteam. where heaters would be turned off in event of pressure building up.
Set Point Temperature	Temperature maximum
Drain Valve	Selects drain valve open?
Jacket Pressure	Na-Jacket not used- normally No
Vacuum Valve	Selects Vacuum Valve open? normally No
Vacuum Pump	Selects Vacuum pump ? normally No
Autofill Timeout	Autofill maximum time before fault condition

HEAT TO STERILISE

Monitor time	This is the maximum in stage before a FAULT is triggered.
Print interval	Print Interval – *see above*
Stabilize time	This is the DELAY time before the Sterilise Stage begins. Typically 1– 2 Min but may be longer depending on the model and the load.
Overshoot Press	Control Pressure for Overshoot setting (overshoot at heat-up to speed up load heating
Overshoot set Pt	Control temp for Overshoot setting
Overshoot Probe	Probe to be read for overshoot normally VENT
Drain Valve	Selects drain valve ? set to closed, = NO
Jacket Pressure	Set Jacket Pressure
Vacuum Valve	Selects Vacuum Valve open? normally No
Vacuum Pump	Selects Vacuum pump ? set to No
Ramp Heat	Not used- set to 0
Ramp Cool	Not used- set to 0

STERILISE

Monitor time	This is the maximum in stage before a FAULT is triggered
Print interval	Print Interval – *see above*
Pressure Hi	
Pressure Low	
Sterilise Press	Set Sterilize Pressure (refer to pressure correlation chart etc)
SterilizeTemperature	This is the temperature for the Sterilise Period. Value depends upon, the load and required sterilisation conditions.
Safe Stage/Sterilize retry	
Drain Valve	Selects drain valve open-closed,
Drain Valve Time	Not used - 0min0sec
Jacket	Set Jacket Pressure
Temperature LOAD	**Vent ----- xx.xC**
Temperature VENT	**Load ----- yy.yC** (load only shows if Load Sensed Probe is available) These are the temperature(s) that the system must reach before the sterilize timed period will start.
Vacuum Valve	Vacuum Valve open? normally No
Vacuum Pump	Vacuum pump ? set to No
Variable Mode	Not used No
Fo	Set to 0

VENTING

Monitor time	This is the maximum in stage before a FAULT is triggered.
Vent Pressure	Pressure at which venting starts
Drain Valve	Drain Valve open = YES to suck out water through drain
Jacket	Not used set to NO
Jacket Pressure	Set Jacket Pressure
Vacuum Valve	Vacuum Valve open? normally No
Vacuum Pump	Vacuum pump ? set to No
Vent Timer	Limit time on venting (where used)

COOLING

Monitor time	This is the maximum time in stage before a FAULT is triggered.
Print interval	Print Interval – *see above*
Cool Pump delay	This is the delay time before the Assisted Cooling Fan or Water cool starts Typ 10 min. (reduces thermal shock and media boiling over.)
Cool time	This is a safety feature. The MINIMUM time that the cooling system must run before the door can be opened. If the Interlocks fail or are overridden this will prevent opening until this time is up. Minimum 10 min. *Ideally set by commissioning engineer when typical cooling time is known.*
Cool overide time	This is the MAXIMUM cooling time that should be required for that load. After this time the door can be opened by use of the password..
Cool Press	(Ballast options only) Pressure at which Ballast system holds the chamber during cooling . Typically 1800 mBar
Cool Temperature	Effectively a "PROGRAMMABLE COOLING LOCK RELEASE TEMP.". – see Cooling Locks section. Normally 80C or below & normally set using a digital thermometer or by trial and error. *If Load Sensed Timing not in use then this is best set by commissioning engineer when typical cooling behaviour of load is known.*
Ramp	Not Used as standard set to 0C
Jacket	Jacket not used - set to No
Ballast Mode	No = if Ballast option not fitted, Integral or External if fitted and to be used,
Cooling Interlock 1	Yes/No Yes= Cooling Lock 1 Operating Yes= Cooling Lock Off
Cooling Interlock 2	As Cooling interlock 1 (Some models only)
Cooling Interlock 3	As Cooling interlock 2 (Some models only)
Drain Valve	Selects whether Drain valve open during cooling - typically NO
Modulate Ballast & drain	(Ballast options only) If set On this ballasts the system at Th normal
Trigger temperature	ballast pressure eg 1800 mBar. When tem falls to the "Trigger
Low pressure	Temperature" the drain opens and pressure is reduced, Then cycles up
High Pressure	and down between Low and Hi Pressure by opening drain to blow out water and air , assisting with cooling air movement.

DRYING/ POSTVACUUM

Monitor Time	This is the maximum in stage before a FAULT is triggered. Must be greater than the Stabilisation Time .
Hold time	This is the set Drying Time (Fluid loads = Postvacuum usually 0 secs)
Set Pressure	The pressure that must be reached to start the Drying/Postvac period
Drain Valve	Drain Valve open = YES to suck out water through drain
Jacket	Set Jacket Pressure
Exhaust	Exhaust Valve Closed = No – Vacuum sucks out water through drain

AIR WASH   (optional- not on default factory Cycles)

Monitor time	This is the maximum in stage before a FAULT is triggered.
Pressure Hi	Upper pressure for airwash pulses
Pressure Low	Lower pressure for airwash pulses
Pulse Count	Pressure for airwash pulses
Drain Valve	Set to NO
Jacket	Not used set to NO

AIR BREAK

Monitor time	This is the maximum in stage before a FAULT is triggered.
Air Break time	Time for air break duration typ 30 sec
Air Break Press	Pressure at which air break is assumed complete eg 900-950 mBarAbs
Jacket	Set Jacket On/Off – typically NO
Exhaust	Exhaust Valve Closed = No ,Open = Yes

CYCLE TYPES - EXPLANATION

The different cycles control which sterilizing stages are executed and in which order. The basic stages are, (START, VACUUM, COOLING AND OR DRYING COMPLETE) There are a number of alternative stages which are only used in specific cycle types.

There are four cycles which are generally required for the sterilising of different products in the Laboratory or medical environment,(FABRICS,GLASSWARE,MEDIA,DISCARD) & a Safety Valve Test Cycle , plus a special cycle for carrying out a Leak Test

The advantage of having a number of cycles available enables the Astell Autoclave to be very flexible in dealing with different requirements and sterilising a variety of loads.

The built-in cycles have been designed in a modular manner so custom cycles can be created easily and quickly .

The following cycles describe the process for four different loads. Note that yourt machine may be restricted in the types of cycles that may be run, depending on the design and facilities fitted.

> **Note that the graphs show Pressure not Temperature**

Fabrics

(1)   Vacuum
(2)   Negative Pulsing
(3)   Positive Pulsing
(4)   Sterilisation
(5)   Cooling
(6)   Drying
(7)   Air Break
(8)   Complete
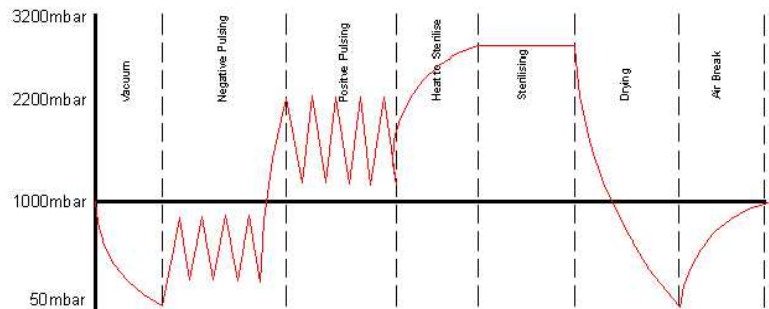
Empty Glassware 121°c

(1)   Vacuum
(2)   Negative Pulsing
(3)   Positive Pulsing
(4)   Sterilisation
(5)   Drying
(6)   Air Wash
(7)   Air Break
(8)   Complete
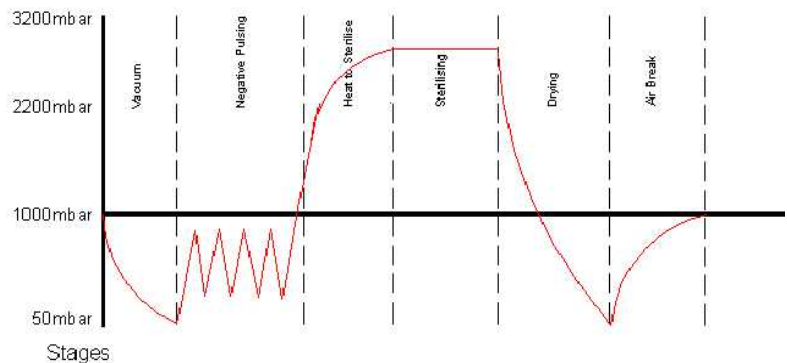
Empty Glassware

Plastic Discard

(1)   Vacuum
(2)   Negative Pulsing
(3)   Positive Pulsing
(4)   Sterilisation i
(5)   Cooling
(6)   Drying
(7)   Air Break
(8)   Complete
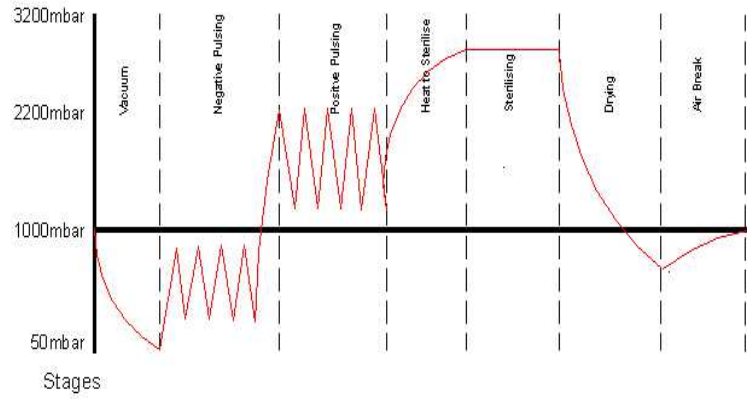
Plastic Discard

Fluid Discard 121°c

(1)   Vacuum
(2)   Negative Pulsing
(3)   Sterilisation
(4)   Cooling
(5)   Drying
(6)   Air Break
(7)   Complete
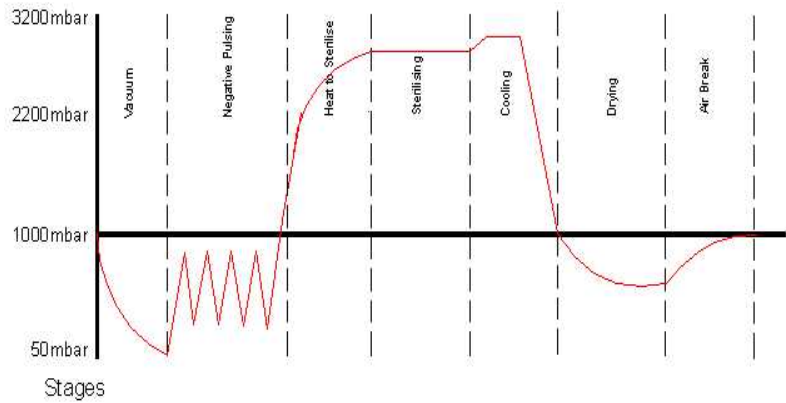
Fluid Discard

Media 121°c

(1)   Vacuum
(2)   Negative Pulsing
(3)   Sterilisation
(4)   Cooling
(5)   Drying
(6)   Air Break
(7)   Complete

Media

Leak Test

(1)   Vacuum
(2)   Leak test
(3)   Drying
(4)   Air Break
(5)   Complete

Leak Test

<table>
<tr><td colspan="3" align="center">**Faults & Alarms Table**</td></tr>
<tr><td colspan="3" align="center">Note; Depending on model there may be additional possible alarm messages</td></tr>
</table>

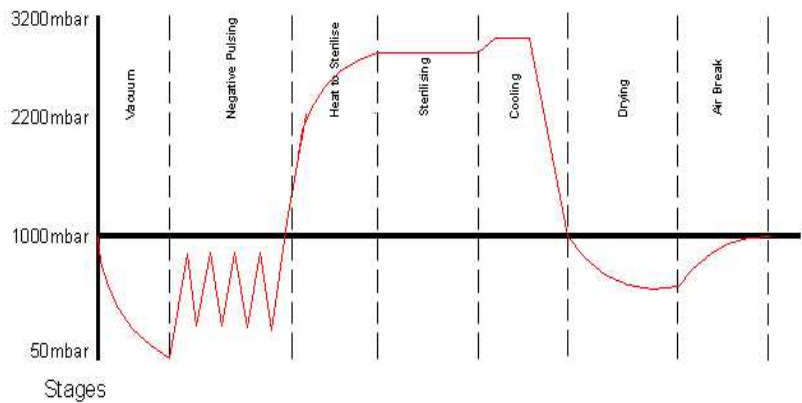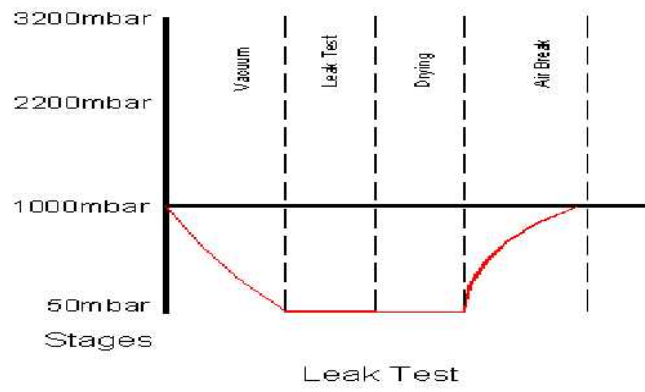| ALARM	DESCRIPTION	
Cycle Aborted	User has manually aborted the cycle from option in the main menu	
Emergency Stop Activated	**The emergency stop button has been activated and the reset button has not been reset.**	
Steam Failure	No Steam to the machine.	
Water Failure	**No Water to the machine.**	
Air Failure	**No Air to the machine.**	
Chamber Transducer Fail	**Chamber Transducer out-of-range , faulty or not connected.**	
Jacket Transducer Fail	**Jacket Transducer out-of-range , faulty or not connected.**	
Drain Probe Failure	**Drain Probe out-of-range , faulty or not connected.**	
Air Detector Probe Fail	**Air Detector Probe out-of-range , faulty or not connected.**	
Vent Probe Failure	Vent Probe out-of-range, faulty or not connected.	
Load Probe Failure	**Load Probe out-of-range, faulty or not connected.**	
Door 1 Seal Failure	**No signal from the seal sensors for door 1 when the door should be sealed/**	
Door 2 Seal Failure	**No signal from the seal sensors for door 2 when the door should be sealed/**	
Power Failure	**The machine has been turned off mid-cycle**	
Door 1 Not Closed	**No signal is being received from the closed sensor for door 1.**	
Door 2 Not Closed	**No signal is being received from the closed sensor for door 2.(double door models only)**	
Door 1 Not Bolted	**No signal is being received from the bolted sensor for door 1.**	
Door 2 Not Bolted	**No signal is being received from the bolted sensor for door 2. .(doubledoor models only)**	
Pre Vacuum Timeout		**Pre Vacuum stage.**
Free Steaming Timeout		**Free Steaming stage.**
Steam Flushing Timeout		**Steam Flushing stage.**
Negative Pulse Timeout		**Negative Pulsing stage.**
Air Detector Test Timeout		**Detector Test stage.**
Positive Pulse Timeout		**Positive Pulsing stage.**
Heating Timeout		**Heating stage.**
Stabilization Timeout		**Stabilization stage.**
Sterilization Timeout	**Stage time has exceeded the stage monitor time ;-**	**Sterilization stage**
Leak Vacuum Timeout		**Leak Vacuum stage.**
Leak Stabilization Timeout		**Leak Stabilization stage**
Leak Test Timeout		**Leak Test stage**
Discard Hold Timeout		**Discard Hold stage.**
Cooling Timeout		**Cooling stage.**
Venting Timeout		**Draining stage.**
Drying Timeout		**Drying stage.**
Air wash Timeout		**Airwash stage.**
Air Break Timeout		**Air Admission stage.**
Air Detector Fail	**The air detector test detected air in process cycle during the Air Detector Test stage.**	
Leak out of Test Range	**The pressure too high in stabilization & test stopped because it is above a set value.**	
Sterilize Under Temp	Control Probe is below Sterilize Temp by. Greater than Sterilize Dropout Temperature	
Sterilize Over Temp	**Control Probe is over Sterilize Temp by. Greater than Sterilize Over Temperature**	
Cooling Override Used	if cooling override set to fault - this indicates that manual cooling override was used.	

BUTTONS AND DISPLAYS- REFERENCE

START button
if the start button is displayed in gray, a cycle has not been selected even though the machine is ready to start.

START button
If the icon is displayed in green the machine is ready to go with a cycle selected.

ABORT button
allows a Supervisor/Engineer to abort a request action made by the operator

ALARM button -   allows the operator to display all the system alarms. Note: this button flashes if an alarm is activated. After an alarm, or the alarm icon has been touched, the password screen is displayed allowing the Supervisor/Engineer to enter their password and cancel alarms that are present.

ACK ALARM CLEAR button –
Flashes RED in the faults/alarms screen if there are faults to clear, press to clear the alarm

ALARM CLEAR button - Shows Green/Grey when alarm is cleared

MENU / NEXT button - goesto the next available screen

BACK / RETURN button -return from selected screens back to the previous screen.

SCROLL UP button - scrolls Up in a list

SCROLL DOWN button - scrolls Down in a list

DOOR OPEN button - Powered Door models – Opens Door
Manual Door Models – Unlocks door to allow manual opening
Note – door may be marked with a [1] on some software versions. On normal machines disregard the [1]

DOOR CLOSE button   - Powered Door models- closes the door
Manual Door Models – shows door open and pressing has no effect Note – door may be marked with a [1] on some software versions.

SELECT CYCLE button - opens the cycle select screen   to select the cycle required
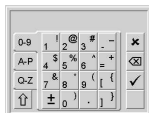
ALPHANUMERIC PAD - Keyboard For Entering Text and Numbers

Keypad UPPER/LOWER CASE button Changes case of Keyboard

Keypad BACK button Cancel last keyboard entry (Backspace)

Keypad ENTER button   Enters text/numbers as typed

NO Button - cancel a request made if incorrect values have been entered

CLOCK button -   Set Time and Date - saves time and date as entered
Also saves dates and times set in delayed start

SETTINGS MENU button -   opens the settings menu screen

DIGITAL OUTPUT (1) button **-** Opens the first screen of digital outputs

DIGITAL OUTPUT (2) button - Opens the second screen of digital outputs

DIGITAL INPUT (1) button - Opens the first screen of digital inputs

DIGITAL INPUT (2) button - Opens the second screen of digital inputs

ANALOG INPUT button - Opens the analog inputs screen

DATE & TIME -   The date and time is displayed in top corners of the screen
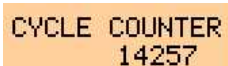
CYCLE COUNTER –The cycle counter is displayed on various screens and indicates how many cycles the autoclave has run. **This is not re-settable.**
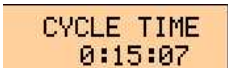
CYCLE TIME - The cycle time is displayed on various screens and indicates how long overall the current cycle has been running

STAGE TIME indicates how long a TIMED stage has been running
(e.g. Vacuum, Heat to Sterilize etc)

TEMPERATURE/PRESSURE DISPLAY - The temperature and pressure channels selected

CONTROLLER SCREEN FITTING

Rear View of CPU Screen assembly

**Clamp Fixings
4 off**

Plug-in Block
24 volt
Power
connections

Plug-in Block
Signal
connections
to modules

D-Plug
9 way
RS232
Comms
connections

IF10 (RS232)
Module only fitted
if Comms options
(or Printer) are
fitted.

USB
Sockets
Type "A"

Plug Memory
sticks in here

CAT5
Ethernet
Connection

For Networking or
remote connection
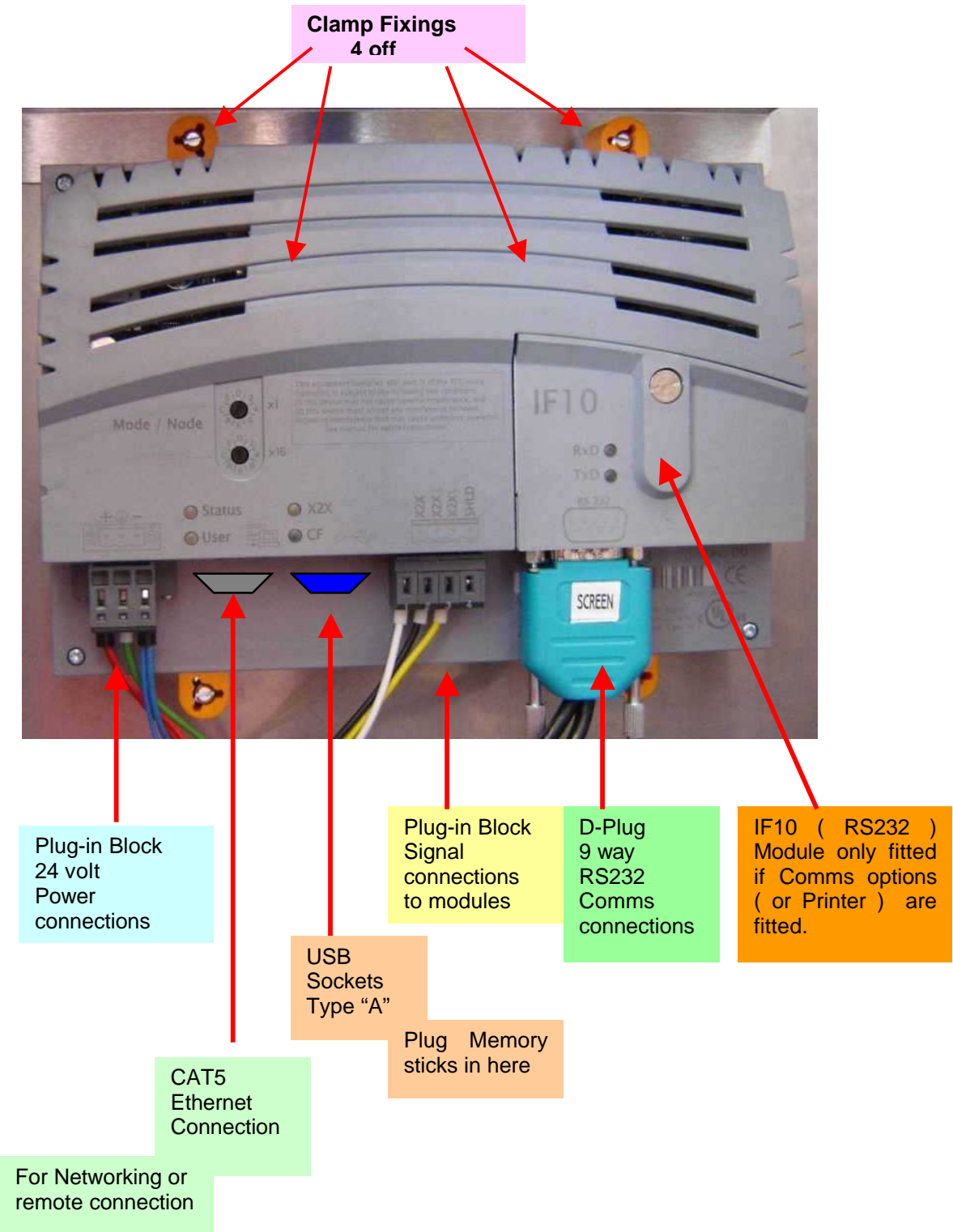
CONTROLLER MODULES

These are sited in the top section of the electrical cabinet.

24 Volt
Switched-mode
Power
Supply

Digital
Input
Modules

Digital
Output
Modules

Analog
Input
Modules

Note;- The above modules are shown as an example only.
Different Sterilizer models may have different combinations of modules .

PRESSURE TEMPERATURE CORRELATION GRAPH
Pressure and Temperature correlation for Saturated Steam

Steam Sterilize Pressure-Temperature Corellation Graph
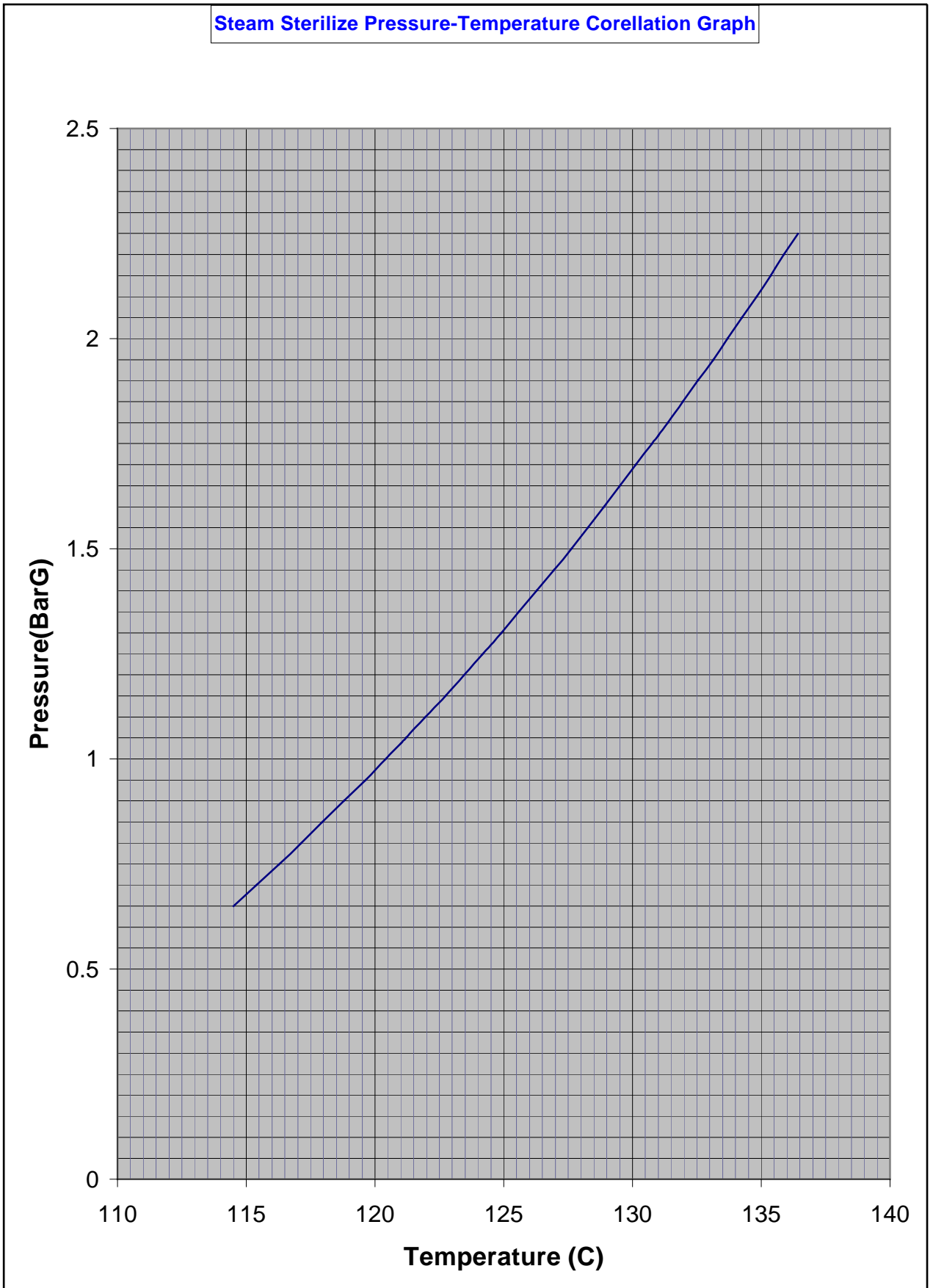
PRESSURE TEMPERATURE CORRELATION CHART

This chart shows Pressure and Temperature correlation for Saturated Steam, and the Maximum/Minimum acceptable Temperature display   Values for a Correlation Accuracy of +/- 2%. It applies to ASTELL Sterilizers only.

Pressure BarABS	Temperature Deg C	Temperature-Tolerance Min	Max
1.650	114.51	112.22	116.80
1.700	115.40	113.09	117.71
1.750	116.28	113.95	118.61
1.800	117.14	114.80	119.48
1.850	117.96	115.60	120.32
1.900	118.80	116.42	121.18
1.950	119.63	117.24	122.02
2.000	120.42	118.01	122.83
2.037	121.00	118.58	123.42
2.050	121.21	118.79	123.63
2.100	121.96	119.52	124.40
2.150	122.73	120.28	125.18
2.250	124.18	121.70	126.66
2.300	124.90	122.40	127.40
2.350	125.59	123.08	128.10
2.400	126.28	123.75	128.81
2.450	126.96	124.42	129.50
2.500	127.62	125.07	130.17
2.550	128.26	125.69	130.83
2.600	128.89	126.31	131.47
2.650	129.51	126.92	132.10
2.700	130.13	127.53	132.73
2.750	130.75	128.14	133.37
2.770	131.00	128.38	133.62
2.800	131.37	128.74	134.00
2.850	131.96	129.32	134.60
2.900	132.54	129.90	135.19
2.950	133.13	130.47	135.79
3.000	133.69	131.02	136.36
3.050	134.25	131.57	136.94
3.100	134.82	132.12	137.52
3.150	135.36	132.65	138.07
3.200	135.88	133.16	138.60
3.250	136.43	133.70	139.16

Note:-This chart is for checking Pressure/Temperature Steam Correlation only & is appropriate for Press/ Temp. instruments specified as accurate to +/- 1% . It should not be used as a equivalent calibration standard for Pressure or Temperature indicators, which must be calibrated in accordance with the Manufacturer's Specifications.

APPENDIX A1
EXAMPLE = SWIFTLOCK STERILIZER (WITH HEATED JACKET)

NOTE
This listing of settings is given as an example   only – Machines may differ in facilities and arrangements so your machine may need different settings to those shown.
Also note that not all stages shown are present in any one Cycle

PARAMETER SETTINGS

PARAMETER	Fabrics P1	Empty Glassware P2	Plastic Discard P3	Fluid Discard P4	Media P5
PRE-VACUUM					
Monitor time	30m	30m	30m	30m	30m
Hold time	3m 0s	0m 30s	0m 30s	0m 30s	3m 0s
Set Presssure	200mBar	200mBar	200mBar	300mBar	200mBar
Drain Valve	Yes	Yes	Yes	Yes	Yes
Jacket	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar
Pressure Timer	0m 30 s	0m 0 s	0m 0 s	0m 0 s	0m 30 s
NEGATIVE PULSING					
Monitor time	30m	30m	30m	30m	30m
Dwell time	3000s	3000s	3000s	3000s	3000s
Set Presssure HI	800mBar	800mBar	800mBar	700mBar	700mBar
Set Presssure LO	300mBar	300mBar	300mBar	300mBar	400mBar
Pulse Count	2	3	2	3	3
Drain Valve	Yes	Yes	Yes	Yes	Yes
Jacket	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar
POSITIVE PULSING					
Monitor time	30m	X	30m	X	X
Dwell time	3000s	X	3000s	X	X
Set Presssure HI	1800mBar	X	1800mBar	X	X
Set Presssure LO	1100mBar	X	1100mBar	X	X
Pulse Count	2	X	2	X	X
Drain Valve	Yes	X	Yes	X	X
Jacket	Yes 2100mBar	X	Yes 2100mBar	X	X
HEAT TO STERILIZE					
Monitor time	60m	30m	60m	60m	30m
Print interval	1m	1m	1m	1m	1m
Stabilize time	0m 30s	0m 30s	0m 30s	0m 30s	0m 30s
Overshoot Press	0mBar	0mBar	0mBar	0mBar	0mBar
Overshoot set Pt	0C	0C	0C	0C	0C
Overshoot Probe	Vent	Vent	Vent	Vent	Load
Drain Valve	No	No	No	No	No
Vacuum Valve	Yes	Yes	Yes	Yes	Yes
Vacuum Pump	No	No	No	No	No
Ramp Heat	0 steps	0 steps	0 steps	0 steps	0 steps
Ramp Cool	0 steps	0 steps	0 steps	0 steps	0 steps
STERILIZING					
Monitor time	60m	30m	60m	60m	90m
Print interval	1m	1m	1m	1m	1m
Pressure Hi	0 mBar	0 mBar	0 mBar	0 mBar	0 mBar
Pressure Low	0 mBar	0 mBar	0 mBar	0 mBar	0 mBar
Sterilise Press	2150mBar	2150mBar	2150mBar	2150mBar	2150mBar
Temperature	121C Safe Stage	121C Safe Stage	121C Safe Stage	121C Safe Stage	121C Safe Stage
Timer	15m 0s	15m 0s	15m 0s	15m 0s	15m 0s
Drain Valve	No	No	No	No	No

PARAMETER	Fabrics P1	Empty Glassware P2	Plastic Discard P3	Fluid Discard P4	Media P5
Jacket	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	No
Temperature LOAD	0C	0C	121C	121C	121C
Temperature VENT	121C	121C	121C	121C	121C
Vacuum Valve	Yes	Yes	Yes	Yes	Yes
Vacuum Pump	No	No	No	No	No
Variable Mode	No	No	No	No	No
Fo	0	0	0	0	0
VENTING					
Monitor Time	X	X	30min	X	X
Vent Pressure	X	X	1600mBar	X	X
Drain Valve	X	X	Yes	X	X
Jacket	X	X	Yes 2100mBar	X	X
COOLING					
Monitor time	X	X	X	90m	90m
Print interval	X	X	X	5m 0s	5m 0s
Cool Pump delay	X	X	X	2m 0s	2m 0s
Cool time	X	X	X	20m	20m
Cool overide time	X	X	X	30m	30m
Cool Press	X	X	X	1800mBar	1800mBar
Cool Temperature	X	X	X	80C	80C
Jacket	X	X	X	No	No
Ballast Mode	X	X	X	Integral	Integral
Cooling Interlock 1	X	X	X	Yes	Yes
Cooling Interlock 2	X	X	X	No	No
Cooling Interlock 3	X	X	X	No	No
Ramp	X	X	X	0C	0C
DRYING					
Monitor time	30m	30m	30m	30m	30m
Hold time	3m 0s	3m 0s	0m 1s	0m 1s	0m 1s
Set Presssure	200mBar	100mBar	500mBar	750mBar	750mBar
Drain Valve	Yes	Yes	Yes	Yes	Yes
Jacket	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	No	No
Exhaust	Yes	Yes	Yes	No	No
AIR WASH					
Monitor time	X	30m	30m	X	X
Pressure Hi	X	700 mBar	700 mBar	X	X
Pressure Low	X	300 mBar	400 mBar	X	X
Pulse Count	X	5	10	X	X
Drain Valve	X	Yes	No	X	X
Jacket	X	Yes 2100mBar	Yes 2100mBar	X	X
AIR BREAK					
Monitor time	30m	30m	30m	30m	30m
Air Break time	0m 30s	0m 30s	0m 30s	0m 30s	0m 30s
Air Break Press	900mBar	900mBar	900mBar	900mBar	900mBar
Exhaust	Yes	Yes	Yes	Yes	Yes

KEY- X = not applicable this Cycle type. (ie this stage not present)

MACHINE SETTINGS
EXAMPLE = SWIFTLOCK STERILIZER (WITH HEATED JACKET)

OPTIONS		
User Logging	No	
Printer	No	Start
Chart redorder	No	
Bar Coder	No	
Batch No	No	
Load No	No	
Delay Start	No	

Calibration		
Load Probe		
Type	Pt100	
Hardware Filter	50 Hz	
Minimum	17.6C	
Maximum	122C	
Vent probe		
Type	Pt100	
Hardware Filter	50 Hz	
Minimum	0C	
Maximum	150C	
Chamber Pressure		
Minimum	0mBar	
Maximum	4000mBar	
Jacket Pressure		
Minimum	1000mBar	
Maximum	2500mBar	

System		
Temperature Probes Fitted		
Drain/Chamber	No	*
Load	Yes	2
Air Detector	No	*
Vent	Yes	1
Range	0c	150C
Tolerance	1C	5C
Probe type	Pt100	
Hardware Filter	50 Hz	

Pressure Sensors Fitted		
Chamber	Yes	
Jacket	Yes	
Range	0mBar-	3500mBar
Overpressure	3600mBar	

Door Control		
Single Door		
Open/close	1 second	
Fault1 close	60 Seconds	
Fault1 seal	10 Seconds	
Fault 2 close	60 Seconds	
Fault 2 seal	10 Seconds	

Power Fail Mode	Safe	

Safety Test Mode		
Set Pressure	3800mBar	
Test Frequency	365 days	

SPARE PARTS AND SERVICE

When ordering spare Parts or requesting Service Assistance please have ready the SERIAL NUMBER and the MODEL NUMBER - both of these are on the RATING PLATE fixed at the rear of the machine .

Service Dept , Astell Scientific
Powerscroft Rd
Sidcup
Kent
DA14 5DT
United Kingdom

Service@Astell.com

Tel 44 (0)208 309 2000   Fax   44 (0)208 300 2247

CERTIFICATION

A Certificate of Examination is supplied with every Steriliser. This meets P.E.D requirements & includes details of Chamber etc. relating to the pressure vessel, specifies the design pressure, the test pressure to which the Chamber was subjected during manufacture, and the date of the Pressure Vessel testing which will be required by an insurance company..

Please note that this equipment comes under the requirements of the CE Pressure Equipment Directive and your machine will certainly need insurance cover and regular inspections. Most QA systems require a formal maintenance contract in place and regular calibration must be carried out .

It is a statutory requirement of the U.K. Health & Safety at Work Act and in many other countries that Sterilisers shall be thoroughly inspected by a competent person prior to use (usually an Engineering Surveyor from an Insurance Company) , and at least every 14 months thereafter. (Section 35(5) of the Factories Act 1961.)

The information on the Test Certificates will be required by the Inspector, and you are advised to take good care of your Certificate.

Test certificates for Electrical safety and Calibration of the control system are supplied as standard, Full test analysis results are available to special request**.**

NOTES SPACE
This space is for your own notes on the system