

# ClonePix™ FL

Robot Manual



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# Introduction to ClonePix FL

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## Manufactured by Genetix Ltd (UK)

ClonePix™ FL is a dedicated solution for imaging, identification, and selective picking of antibody or protein secreting cells. The technology is based on quantitative fluorescence detection. The system is also compatible with direct fluorescence (e.g. GFP expression).

- Automated delivery and lid removal of 1 well and 6 well micro-plate format plates to on board imaging station and dispersal of picked colonies to 96 well plates.
- Fluorescent imaging using a choice of five filter sets.
- Colonies selected on the basis of size, shape and proximity to neighbors.
- Colonies ranked based on fluorescent intensity of the colony or the secreted product.
- Automated selective picking using high precision picking pins with proprietary cleaning routine between each pick.

Intuitive Windows®-based software allows you to easily set up multiple picking processes and analyze the results. For detailed information about the software please see the ClonePix FL Software Application Manual.

**Note:** ClonePix FL is strictly for research use only and is not intended or recommended for the diagnosis of disease in humans or animals.

If the robot is used in a manner not specified in this manual the protection provided by the equipment may be impaired.



# Technical Specifications

## External Dimensions and Weight

Size (excluding ancillary equipment): 1010mm (width) x 900mm (depth) x 1495mm (height)

Weight: Robot - 350 kg (maximum)  
Compressor - 60 kg

## Compressed Air Supply

Minimum Pressure: 6 bar  
Minimum volume: 80L/min

## Operating Environment

### Indoor use only

Temperature: 10°C to 40°C  
Humidity: 20 to 80% non-condensing  
Altitude: Up to 2000M  
Mains supply: +/- 10% Rated Voltage  
Transient overvoltage: Installation Category (Overvoltage category) II  
Rated pollution: Pollution degree 2



# Electrical Supply

## European:

Voltage:	210 - 250V AC 45-66 Hz single phase
Power:	Robot - 2500W Halogen Heater - 300W
Connections:	IEC Input - Robot Mains / Halogen Heater IEC Output - PC IEC Output - Monitor
Fuses:	Input - F3 – T10A - Robot / Halogen Heater Output - F2 - T5A - Computer and Monitor
Compressor:	230V AC 50Hz 3.4A

## USA/Japan:

Voltage:	100 – 125V AC 45-66 Hz single phase
Power:	Robot -1250W Halogen Heater - 300W
Connections:	IEC Input - Robot Mains / Halogen Heater IEC Output - PC IEC Output - Monitor
Fuses:	Input - F3 - T10A - Robot / Halogen Heater Output - F2 - T5A - Computer and Monitor
Compressor:	120V AC 60Hz 7.5A



# Electrical Connections

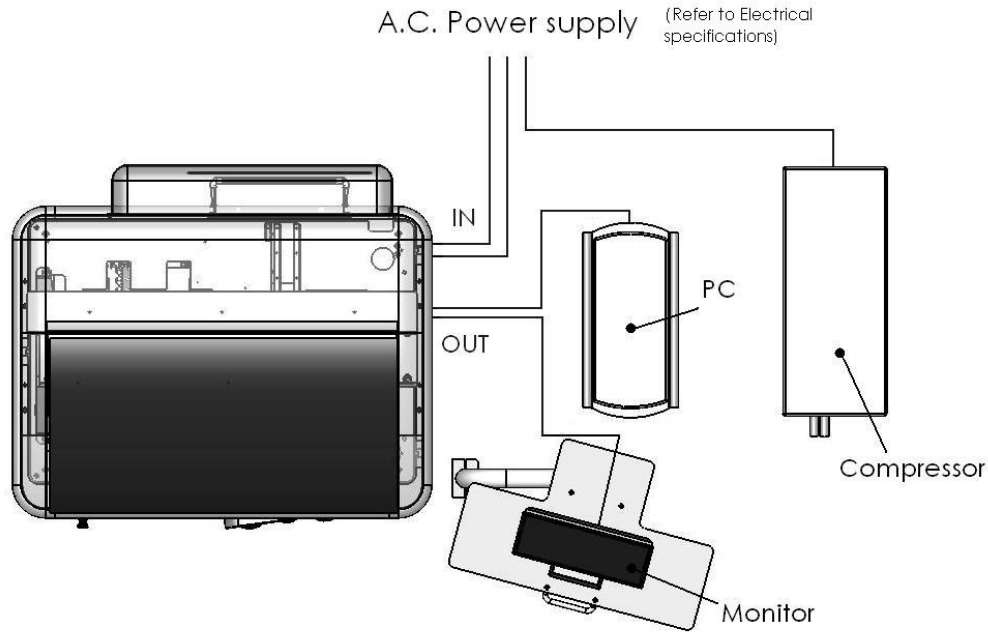


Figure 1:  
ClonePix FL electrical connections

# Symbols on Equipment

Symbol	Meaning
	Beware moving parts. Refer to Robot Manual for operating instructions.
	The year of manufacture is given on the serial number label which is located on the right side of the unit.
	<b>European Economic Area (EEA)</b> This mark on the product indicates compliance with the following EEC Directives: <ul style="list-style-type: none"> <li>- 98/37/EEC, relating to The Supply of Machinery (Safety) Regulations 1992</li> <li>- 89/336/EEC with amendments 92/31/EEC, relating to Electromagnetic Compatibility</li> <li>- 73/23/EEC, the Low Voltage Directive</li> </ul>





# PC Connections

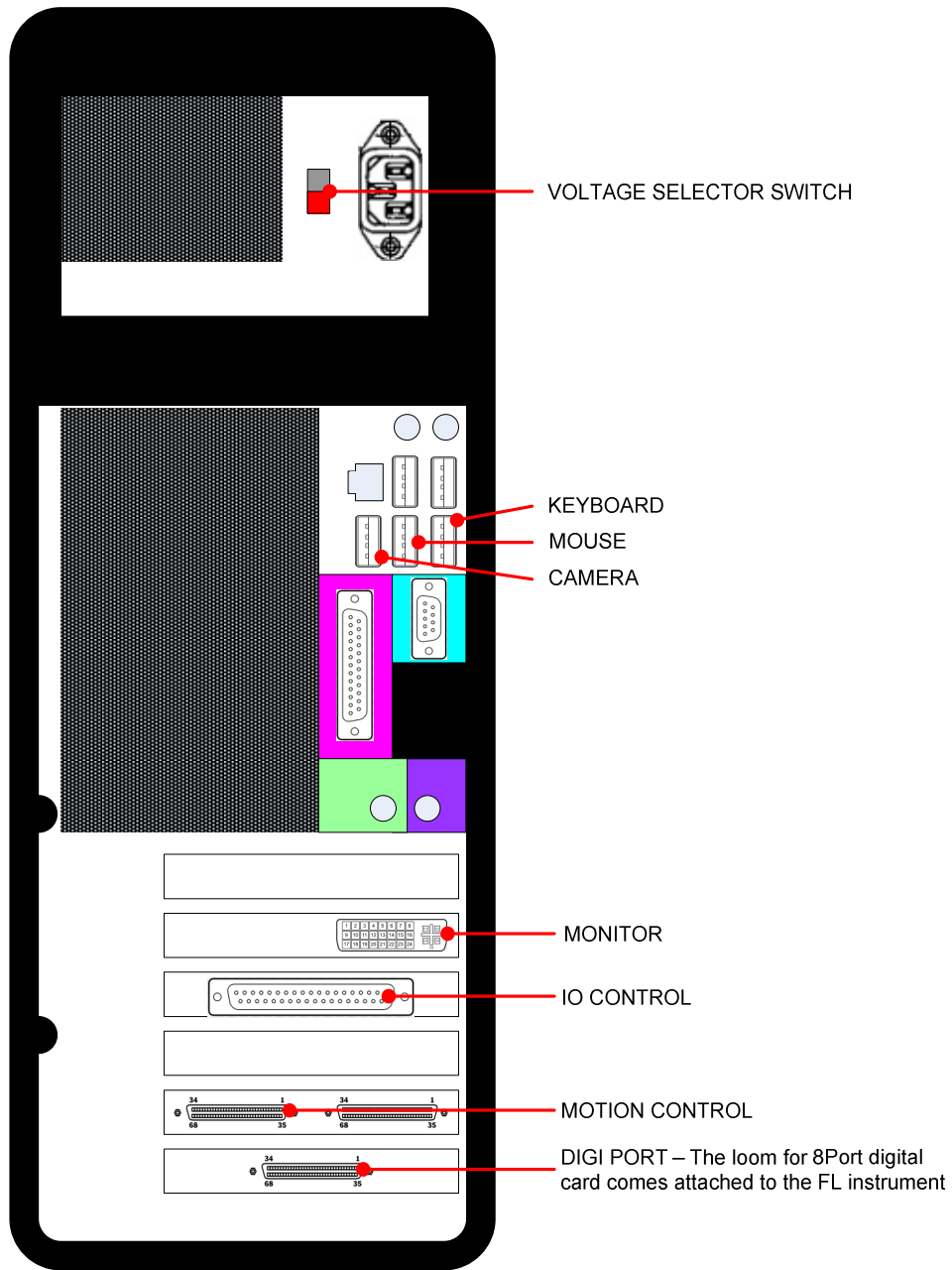


Figure 2:  
ClonePix FL PC connections



## Filter options

Filter set		Excitation		Emission	
Cat. No.	Suitable for:	Wavelength (nm)	Filter Position	Wavelength (nm)	Filter Position
X4990	CFP AF430	440 (Royal Blue)	4	505 (Cyan)	4
X4991 (standard)	CloneDetect FITC* Fluorescein GFP AF488	470 (Blue)	3	535 (Green)	3
X4992	YFP	500 (Cyan)	2	550 (Yellow)	2
X4993	CloneDetect 549* R-phycoerythrin Rhodamine AF546	530 (Green)	1	590 (Red)	1
X4994	CloneDetect 649* Cy5 FMAT Blue AF647	622 (Red)	6	700 (Far Red)	6

### Notes:

- \*Refer to [Reagents & Supplies](#) section for details on how to order CloneDetect reagents.
- White light imaging uses excitation filter position 7 and emission filter position 5.



# Robot Enclosure

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ClonePix FL is designed to provide a controlled environment for sample protection conducive to accurate and reliable mammalian cell picking. Protection within the robot top cover is provided by utilizing a rear mounted HEPA filtered air supply and a front mounted exhaust fan. This creates a horizontal laminar flow of sterile air across the picking area of the bed of the machine whilst the front door is closed.

The main features are:

- Class 100 type enclosure
- Offers product protection from particulates and microbes.
- HEPA filtration (99.999% at 0.3 microns exclusion).
- Laminar airflow across the bed.
- Air inflow greater than air exhaust maintains positive air pressure.
- Always on when ClonePix FL is on.
- Integrated UV germicidal lamp with timer.

**Note:** The ClonePix FL robot enclosure does not offer operator protection.

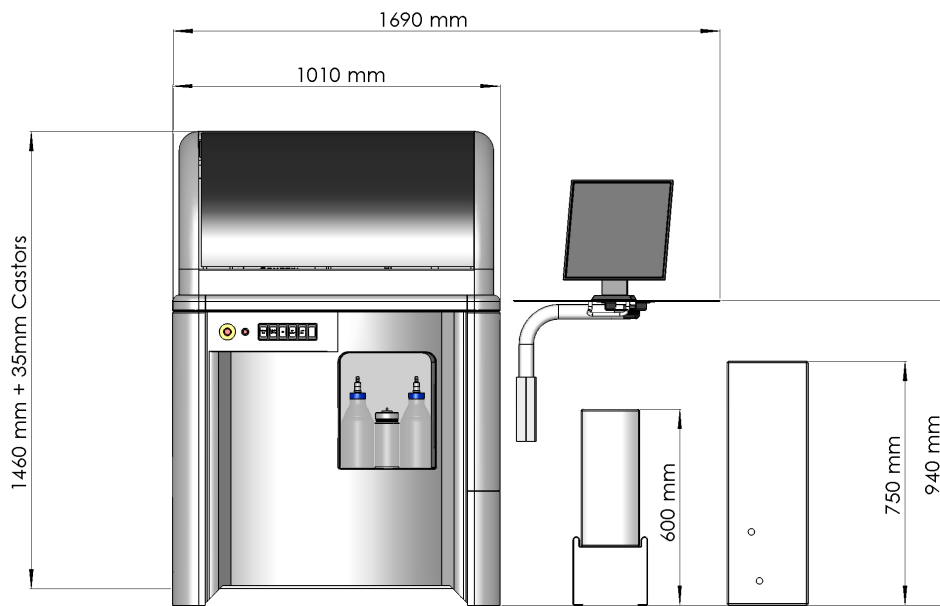


# Installation

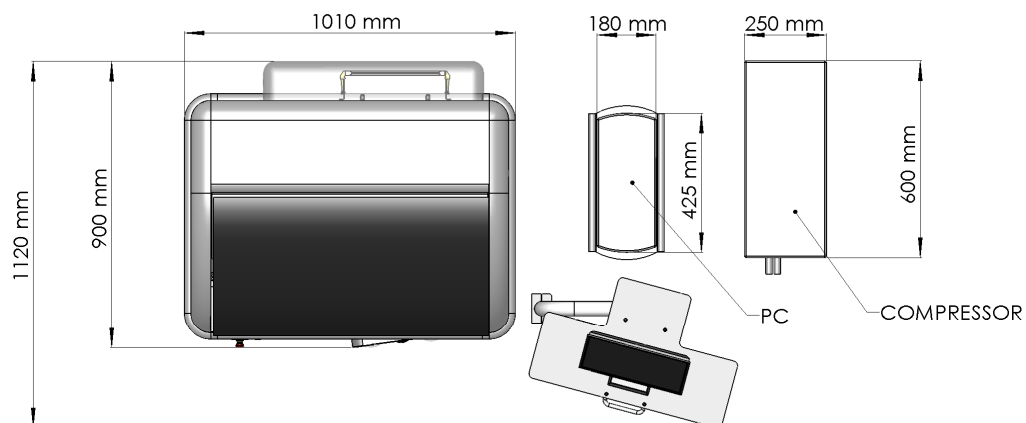
**Note: Installation is to be undertaken only by Genetix approved personnel.**

## Layout of ClonePix FL and Ancillary Equipment

Front view:



Top view:

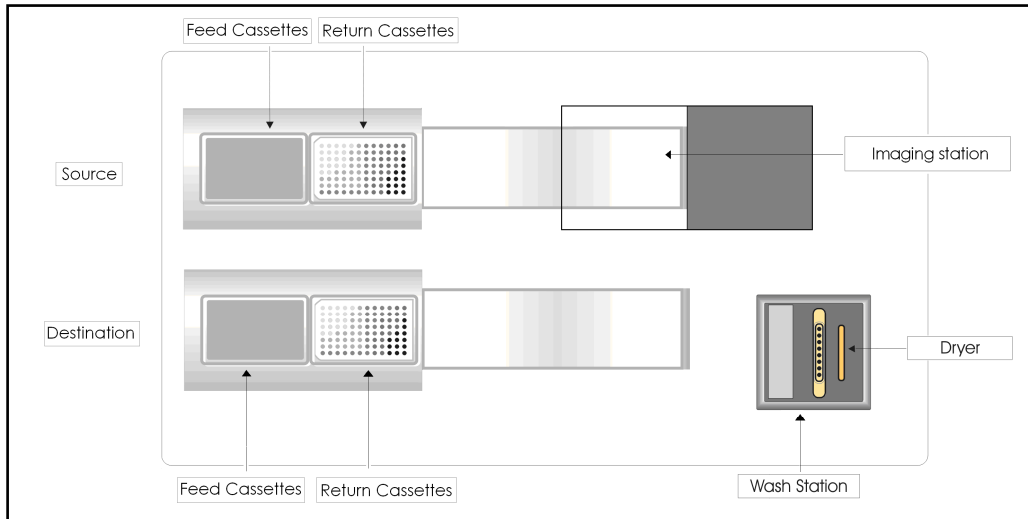


**Figure 3:**  
ClonePix FL layout and dimensions



## Source and Destination Plate Stackers

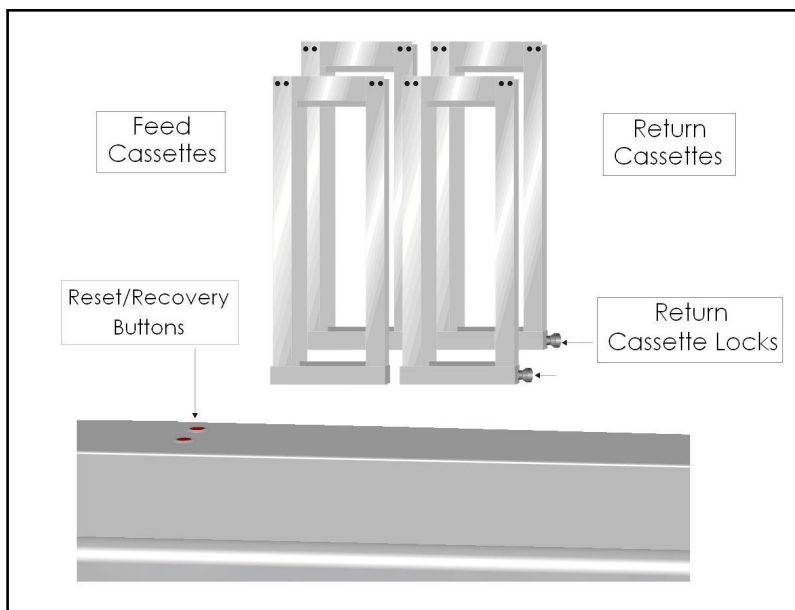
ClonePix FL uses a stacker system to hold and process the source and destination plates. The source stacker is located at the rear of the machine and the destination stacker towards the front. The stacker cassettes can accommodate up to 10 standard microplates or 12 Genetix microplates. Plates must be loaded into the feed cassette with **lids on** and **well A1 facing towards the imaging station**. The filled feed cassette and empty return cassette are then placed into the respective stacker. The plates are automatically fed onto the bed individually and the lid is removed as the plate is pushed past the return cassette location. The lid is replaced as the plate moves to the return cassette.



**Figure 4:**  
**Stacker orientation**

To insert the feed cassettes, push firmly into place until the cassette sits in the stacker.

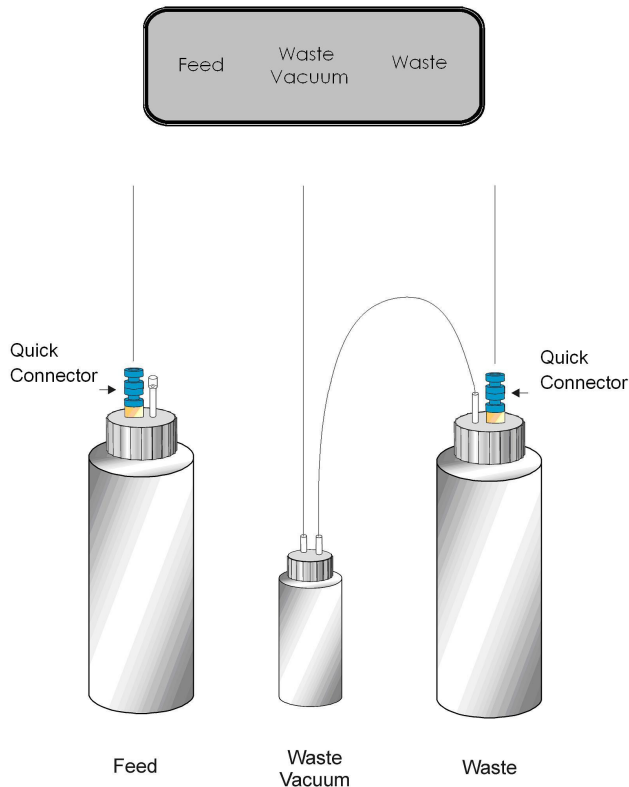
The return cassettes have a locking mechanism to secure them while in use (see Figure 5 below). To insert the return cassette, pull the return lock outwards and twist it about a half turn to hold in the 'out' position. Lower the cassette into the stacker then release the return lock by turning it again about half a turn. Check that the lock returns fully into place.



**Figure 5:**  
**Stackers and cassettes**

## Connecting the Wash Bottles

The tubing carrying system fluid (sterile water) to the Wash Station and back to the waste bottles will be connected by a Genetix approved engineer on commissioning of **ClonePix FL**. If it is necessary to disconnect these make sure that they are marked so that the tubes can be re-connected correctly. The outlets on the machine are in the same order as the bottles on the wash station.



**Figure 6:**  
**Connecting the wash bottles**

## Connecting the Ethanol Bottles

The tubing carrying ethanol to the Ethanol Wash Bath and back to the ethanol waste bottle will be connected by a Genetix approved engineer on commissioning of **ClonePix FL**. If it is necessary to disconnect these make sure that they are marked so that the tubes can be re-connected correctly.

## Camera Alignment

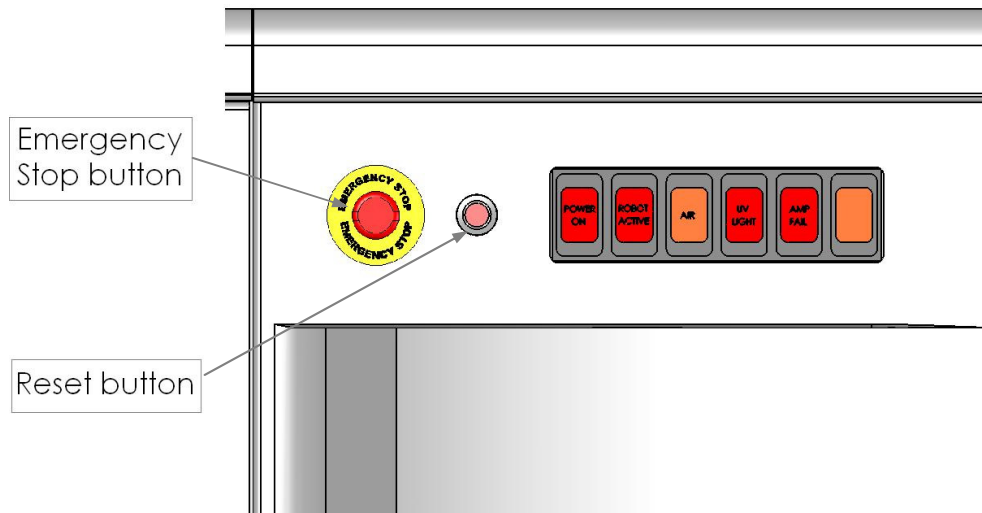
To guarantee the most accurate picking, it is crucial that the camera is calibrated and aligned correctly.

The aim of camera alignment is to achieve pin-to-spot accuracy, relating the image pixel co-ordinates with the robot x, y co-ordinates.

Calibration and alignment are performed before ClonePix FL is dispatched and will be checked by a Genetix approved engineer when the robot is installed.

If the actuator is subject to a knock or a crash, picking accuracy may be affected. Therefore it may be necessary to re-calibrate the camera. **This should be carried out by a Genetix approved engineer.**

## ClonePix FL Panel



**Figure 7:**  
**ClonePix FL Panel**

The lights on the panel indicate which elements of the robot are operating. The panel houses the **Reset** button and the **Emergency Stop** button.

# Health and Safety

## Important Note



Before using the robot, it is very important that you have read this manual and have understood all the safety instructions.

Prior to using the robot, please make sure that you have been through the robot Pre-Power-Up checklist. This checklist ensures that all moving parts on the Robot are correctly situated in their datum positions.

Then follow the procedures as set out in the Power Up section.

## Transport and Storage

The robot must be stored and transported in temperatures within the range -25°C to +55°C.

The machine is fitted with caster wheels for ease of movement.

## Lifting Points

The machine should not be moved after installation. If relocation is necessary, standard lifting gear is adequate but should be undertaken only in the presence of a Genetix approved engineer.

The robot should be moved into position using appropriate handling equipment such as forklift trucks or dolly trucks. The machine should be properly balanced on the forks prior to lifting.

**Important note: Do not use any part of the exterior bodywork to lift the instrument as this may cause irreparable damage.**

## External Covers



**Warning** – If any of the external covers on ClonePix FL are removed the power supply is **not** automatically interrupted. If it is necessary to remove any of the external covers it is essential that the power is **switched off** first. Do not attempt to use the robot until the covers are replaced.



# Safety Features

## Isolator Switch:

Turns on power to ClonePix FL. The isolator switch is the round red switch located at the bottom of the right-hand side panel. ClonePix FL is powered up by turning the switch 90° from 'O' to 'I'.

## Door:

The machine will not run with the front door open. If the door is open an electromagnetic switch prevents the machine from running. This switch should never be tampered with, as it serves two purposes:

- It prevents the motors from running and therefore the potential of any physical damage.
- It disables the UV light therefore preventing the risk of damage from UV radiation.

The door is made from acrylic, and so prevents UV light from passing through during operation.

## UV Light:

ClonePix FL is fitted with a UV germicidal lamp with timer. This is a 30W linear discharge lamp with a sharply defined output at 253.7nm making the lamp an efficient source of germicidal radiation.

## Emergency STOP Button:

The location of the Emergency Stop button is shown in Figure 7 (Page 15). Striking the Emergency Stop button will **immediately** stop the machine and cut power from the drives. The button must be pulled out before the machine can be restarted.

**Note:** If the PC is powered from the robot, power to the PC will also be cut and current data will be lost.



## Electrical Safety



The robot must be connected to a properly earthed power outlet to protect users from the risk of electric shock. The main chassis of the machine is earthed together with all associated electrical components.

Do not remove any of the fixed covers, as there are no user serviceable parts inside. All internal work should be referred to Genetix approved service personnel.

In the event of a liquid spillage into the base cavity of the robot, the power supply must be disconnected at the mains before any attempt is made to clean up the spillage.

There should not be any spillage from the Wash Bath in normal use with the Wash Station correctly set up. However, spill trays have been fitted where appropriate.

## Drive Safety



**Be aware that the motors use high-powered magnets.**

The linear drive units and encoders are delicate so great care should be taken with them.

The Pre-Power-Up checklist should be followed before every routine in order to prevent serious damage to the robot or any of its constituent parts.

Power is removed from the drives when the doors are open.

## Hot Air/Halogen Dryer

ClonePix FL is fitted with an ultra-high temperature halogen dryer. The casing may become hot during the drying cycle.

## Noise Levels

During normal operation the level of airborne noise emitted by the robot will not exceed 70db measured at a distance of 1 meter.

## Service and Maintenance

It is strongly recommend that maintenance be carried out regularly by a Genetix-approved service engineer.

Maintenance contracts can be obtained from Genetix. Please contact [sales@genetix.com](mailto:sales@genetix.com).

The user is responsible for [General Maintenance](#) (page 21).



# Initial Operation

## System Features

ClonePix FL is constructed within a welded steel framework. The outer measurements are given in the Technical Specifications section on page 6. Be aware that these dimensions do not allow for opening robot doors.

The lifting door on the front of the machine, protected by an electro-mechanical interlock, contains the working volume of the machine.

The bed of the machine contains the source and destination stackers, and the wash system, which is used for cleaning the Picking Pins between cycles in order to eliminate pin blockage and cross-contamination.

The stacker system can hold up to 10 standard microplates or 12 Genetix microplates.

The Z ball-screw drive carries a unique actuator system that accommodates the head. This system allows for easy exchange and set-up of the head.

## Pre-Power-Up Checklist

- Check that the Emergency Stop button (see Figure 7 on page 15) is released (pulled out). ClonePix FL will not start if the button is pushed in.
- Check that no items have been left on the bed of the instrument.
- Check that all motor tracks are free of obstruction.
- Check that there are no obstructions to head movement.
- Check that the main robot axes, XY, are roughly in the centre of their respective travel positions. The axes need to be away from their respective end-stops on 'start up' in order that they may reference themselves correctly to their 'home' positions.
- Check that the lifting door on the front of the robot is closed.
- Ensure that there are no plates or cassettes in the stackers.



# Power-Up Procedures

**Note: The computer will power on with ClonePix FL.**

- Turn on the power supply to the compressor.
- Turn main isolator switch on the lower right side of the unit to the on position (1). This isolator switch is lockable and clearly labeled. The red 'Power On' indicator (on the front panel of the instrument) illuminates. If the system fails to 'power on', it is likely that the lifting door is open or the emergency stop button is pushed in.
- Check that the air supply indicator (on front panel) is on.
- Ensure RESET button is pressed (red light goes off).
- Once the computer has booted up, click on the ClonePix FL icon. The first time ClonePix FL is used, the three axes will sequentially go through their 'Initialize drives' routine. This enables the drives to find their respective datum positions. ClonePix FL must be allowed to complete this process without interference to ensure that there is no damage to the instrument or its ancillary equipment.

# Shutdown procedure

- Exit from the ClonePix FL application by selecting Exit from the File menu on the main setup screen.
- Close down Windows – Click the Start menu at the bottom of the screen then click Shut Down. Wait for computer to switch off completely.
- Switch the main isolator switch to the off (0) position.
- Turn the power off at the mains.



# General Maintenance

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## Regular Maintenance

### Daily

- Check that the robot interior is clean and free from any obstruction.
- Ensure sterile water (feed) bottle is connected to the system fluid supply line. Empty the waste bottle every time that a new sterile water bottle is connected.
- If the system is sterile, purge the system fluid supply line on first use to remove air bubbles that will have developed overnight. If there is doubt about sterility, run the 'Prepare for Pick Run' routine which includes a purge of the system fluid supply line with Genetix Sterilizing Agent (K8080).
- During the purge, check that there are no air bubbles in the supply line coming from the sterile water bottle (indicates a fault in the connection), and that there are no leaks around the picking head (indicates a blocked pin). If there is a leak, or if a tube detaches from the head, replace blocked pin with a new one or follow the pin cleaning procedure below.
- Fill ethanol wash bath with 70% Ethanol. For systems fitted with a replenishing ethanol wash bath, check that there are no kinks in the supply/waste tubing and then run through with 70% ethanol. Check that the bath fills with ethanol and that the waste ethanol flows freely into the waste bottle. On first use, it may be necessary to run through several times.

### Weekly

- In any week that ClonePix FL is not used, it is important to purge the system fluid supply line with sterile water, and run 70% ethanol through the replenishing ethanol wash bath (if fitted). Failure to keep the pumps regularly primed may lead to system malfunction.
- Autoclave the picking pins.
- Check operation of interlock switch and emergency stop.
- Check the compressed air filter for signs of moisture. If necessary, push the drain upwards to force moisture out.

### Monthly

- Sterilize picking head and silicon supply pipes (picking tubing).
- Sterilize source plate illumination cover.

### Annually

- Preventative Maintenance Service – only to be carried out by Genetix approved personnel.

### As Required

- If the robot is used in particularly dusty conditions, the HEPA filter or pre-filter should be checked and may need to be replaced more frequently than recommended (by Genetix approved personnel).



## General Precautions

- All wastes, e.g. ethanol, must be disposed of according to local regulation. Ethanol is flammable and should be handled accordingly.
- Do not use in explosive environments.
- For safety reasons the front door interlock should never be interfered with or overridden. If the door is opened at any stage this will trigger the actuator head or germicidal lamp to stop until the door is closed.

## Cleaning Procedures

### Removable Parts

The design of ClonePix FL permits all components coming into close proximity with biological material to be removed and cleaned:

#### Picking Head

The picking head can be regularly sprayed with 70% ethanol *in situ* and allowed to dry in the HEPA laminar air flow.

For more thorough cleaning use the following procedure:

1. Remove picking head from ClonePix FL (see instructions below), and remove pins and picking tubing.
2. Submerge head into a beaker of 70% Ethanol.
3. Depress highest piston to allow interior to fill.
4. Leave 10 minutes.
5. In a sterile environment, lift head out of ethanol.
6. Depress highest piston to allow interior to empty.
7. Leave to air dry.
8. Replace picking head.

If contamination is suspected the picking head may occasionally be treated with Genetix Sterilizing Agent (K8080) as follows:

1. Remove picking head from ClonePix FL, and remove pins and picking tubing.
2. Make up Sterilizing Agent (K8080) in 1 liter warm water.
3. Submerge head into sterilizing solution.
4. Depress highest piston to allow interior to fill.
5. Leave 10 minutes.

**Do not leave head in Sterilizing Agent for longer than 10 minutes because acetic acid generated as a by-product may cause discoloration or deterioration of function**

6. In a sterile environment, lift head out of sterilizing agent.
7. Depress highest piston to allow interior to empty.
8. Submerge head into a beaker of sterile water.
9. Depress highest piston to allow interior to fill.
10. Lift head out of water.
11. Depress highest piston to allow interior to empty.
12. Repeat steps 8-11 multiple times to remove Sterilizing Agent.



13. Hold head over an empty beaker and spray liberally with 100% ethanol including the interior.
14. Depress highest piston and ensure that the interior is well-drained.
15. Leave to air dry.
16. Replace picking head.

**Important note:** Autoclaving the head is not recommended as this can cause deterioration of function.

Genetix recommends that each project/group should have at least one picking head.

## Picking Pins, O-rings and Pin Removal Key

The Picking Pins, O-rings and Pin Removal Key should be regularly cleaned and autoclaved using the following procedure:

1. Remove pins from picking head (see instructions below).
2. Make a 2% solution (50mls) of aQu Clean Pin Cleaning Solution (K2505) in a small plastic beaker.
3. Place all the items in the solution and sonicate for 10 minutes.
4. Rinse thoroughly in de-ionized water.
5. Place items in de-ionized water and sonicate for 10 minutes.
6. Autoclave pins, O-rings and pin removal key.

Recommended standard autoclave conditions are 121 °C at 15 psi (103 kPa) for 20 minutes. Genetix recommends that each project/group should have at least two sets of Picking Pins.

## Picking Tubing

Picking Tubing (X4970) is the 8 silicon tubes that connect between the picking head and the actuator. These tubes can be cleaned along with the picking head, or can be autoclaved using standard conditions: 121 °C at 15 psi (103 kPa) for 20 minutes.

## Ethanol Wash Bath & Nylon Bristle Insert

The stainless steel Ethanol Wash Bath & Nylon Bristle Insert is filled with 70% ethanol in normal use. It can additionally be treated by filling with Sterilizing Agent for 10 minutes prior to flushing through with 70% ethanol.

If contamination is suspected the Wash Bath and Bristle Insert may occasionally be autoclaved using standard conditions: 121 °C at 15 psi (103 kPa) for 20 minutes. Slight distortion of the nylon block following autoclaving is normal, and this can be forced back to straightness. However, a severely warped block must not be used as this may cause pin / robot damage.

## Source Plate Illumination Cover

The Source Plate Illumination Cover can be removed and sprayed/wiped with ethanol or autoclaved as required using standard conditions: 121 °C at 15 psi (103 kPa) for 20 minutes.

## Wash and Waste Bottles

The Wash (Feed) Bottle must be sterile before use:

1. Fill the Wash Bottle with demonized water.
2. Replace cap but leave loose. Failure to do this may damage the bottle.
3. Seal the air inlet pipe with an autoclavable 0.2µm disposable filter.



4. Autoclave using standard conditions: 121 °C at 15 psi (103 kPa) for an appropriate time. The time required to ensure sterility will be dependent on the autoclave system used.

The Waste Bottle and Waste Vacuum Bottle can be sterilized if required. Bottle caps must be loose to prevent damage to the bottles.

Genetix recommends that each project/group should have at least three Wash Bottles and one Waste Bottle. One Wash Bottle should be kept for Cleaning of System Fluid Supply with Sterilizing Agent (see instructions below).

## Silicon Supply Tubes to Wash and Waste Bottles

Silicon supply tubes can be removed and autoclaved as required using standard conditions: 121 °C at 15 psi (103 kPa) for 20 minutes.

## Cleaning of Instrument Interior

For efficient decontamination of pathogenic micro-organisms, all non-removable parts within the ClonePix FL top cover should be sprayed or wiped with Genetix Sterilizing Agent (K8080) or 70% Ethanol.

Abrasive cleaners should not be used, as they will damage the surface of the bed.

ClonePix FL can be left in a laboratory during formaldehyde vapor fumigation at an appropriate concentration.

**Note:** Excessive formaldehyde treatment will damage sensitive electrical and optical components.

## Cleaning of System Fluid (Sterile Water) Supply

The cell collection process relies on the presence of non-expandable system fluid (sterile water) between the pumps and the picking pins. Only at the tip of the picking pins is a small amount of air (default 2µl) drawn in from the sterile interior immediately prior to sample collection to separate the sample from the system fluid. The system fluid is fed in from a detachable wash bottle and the waste fluid is voided directly to the waste bottle. The system fluid is also used to purge out the picking pins between each cycle of picking (see Automated Picking Pin Cleaning below).

The Wash and Waste bottles are easily and securely changed using the quick-release connectors with check valves that close when the connection is broken. It is recommended to liberally spray 70% ethanol onto the connectors before re-connection.

To ensure a sterile supply of system fluid, it is essential to regularly sterilize the system fluid lines using Genetix Sterilizing Agent (K8080). Please follow instructions by running 'Prepare for Pick Run' in the software. The required frequency of sterilization is dependent on usage, but should be conducted at least once a week, and after any period of non-usage.

**Note:** Never clean the ClonePix FL system fluid lines with bleach.

## Incoming Compressed Air Supply

Compressed air is required for the gentle picking action of the picking pins, and for controlling the movement of the illumination cover. The supplied oil-free compressed air unit draws air from the local environment and filters it to 0.02 microns using a 3-stage filtration process.





## Automated Picking Pin Cleaning

The reusable Picking Pins are subject to repeated pin cleaning during a picking run. Specifically, they are cleaned prior to the first pick, between each cycle of picking, and at the end of the run. There are 4 components to the cleaning process:

- Unidirectional purge of sterile water to clean the internal bores of the picking pins.
- Brushing of the picking pins in the Ethanol Wash Bath for effective mechanical cleaning of the pin exterior.
- Halogen dryer to heat the picking pins and remove residual ethanol.
- Air blower blows sterile air over the picking pins to cool them ready for the next pick.
- The length of each of the above steps can be user defined according to the application but the halogen dryer should not be run for less than 10 seconds.

**Note:** The automated cleaning is not designed to replace the sterilization of picking pins by autoclaving.

## Sterility Validation Tests

Described below are two typical sterility tests conducted on ClonePix FL.

### 1. Chamber sterility test

A ClonePix FL was prepared using the cleaning procedures described above. A Trypticase Soy Agar\* plate (BD Biosciences #221185) was placed open on the robot bed during a prolonged mammalian cell picking run. After 20 minutes the plate was covered, removed, and replaced with another open plate. This was done with a total of 6 plates to cover a 2 hour period. The plates were incubated at 37 °C for 2 weeks to encourage any potential contaminant growth. After this period there was no contamination on any of the agar plates.

\*A general purpose medium which supports the growth of fastidious and nonfastidious microorganisms.

### 2. Mammalian cell picking sterility test

A ClonePix FL was prepared using the cleaning procedures described above. CHO-S cells were plated in chemically defined medium without antibiotics and rendered semi-solid using Genetix CloneMatrix (K8500). The plates were incubated at 37 °C for 10 days to grow the cells into clonal colonies. Selected colonies (n=175) were picked using ClonePix FL into 96 well plates prefilled with 200µl liquid medium without antibiotics. The picked cells were allowed to grow for 12 days, then replenished with fresh liquid medium without antibiotics, and then expanded to exhaustion (4 weeks). After 4 weeks there was no visible contamination in any of the wells.



# Changing the Picking Head

## Remove Head:

- Click the Remove Head icon under Utility processes. This will move the head into the appropriate position.
- Remove all of the picking tubing from the left-hand side of the head. A microplate lid may be placed under the picking head to collect any drops of water.
- Undo the thumbscrew on the right-hand side, which secures the head to the actuator assembly, taking care not to lose the washer.
- Slide the head out of the actuator, being careful not to damage the pins.

## Replace Head:

- Click the Replace Head icon under Utility processes. This will move the head into the appropriate position.
- Slide the head into the actuator.
- Tighten the thumbscrew on the right-hand side to secure the head.
- Fit the picking tubing to the tube connectors starting at the back and working forward, making sure that each tube is fitted to the correct connector.
- Follow the instructions to purge and align the pins.

**Important note: When handling the picking head take care that the pins are not knocked. Damage to pins may produce unreliable results and can cause serious damage to ClonePix FL. If any pins are suspected to have incurred damage please replace them immediately.**

# Changing or Replacing Picking Pins

Occasionally the pins may need to be removed from the picking head for cleaning or to change to a different pin type.

Remove the pins from the head by unscrewing each one anti clockwise with the Pin Removal Key (X4948).

Prior to re-fitting, ensure that each pin has an O-ring (X1036) on the thread. Screw the pins back into the head clockwise using the Pin Removal Key just until resistance is felt. Avoid over-tightening.



# Replacement Parts and Optional Extras

Please refer to the Genetix website for the latest replacement parts and optional extras  
[www.genetix.com](http://www.genetix.com)

## Replacement Parts

Code	Description
X4941	Additional picking head populated with eight X4961 (F1 Pins)
X4942	Additional picking head populated with eight X4962 (F2 Pins)
X4949	Additional picking head without pins
X4961	F1 – ClonePix FL colony picking pin, 0.40mm diameter (Single pin)
X4962	F2 – ClonePix FL colony picking pin, 0.70mm diameter (Single pin)
X1036	O Rings for picking pins (Pack of 8)
X4970	Replacement picking tubing (Pack of 8)
X4948	Picking Pin Removal Key
X3445D	Cassette for stacker system
X4975F	5L Feed (wash) bottle & fixings
X4975W	5L Waste bottle & fixings
X4976	Nylon bristle ethanol bath insert

## Optional Extras

Code	Description
SL4950-A01	ClonePix FL Remote Data Viewer
X4990	ClonePix FL filter set ex 440 em 505 (CFP)
X4992	ClonePix FL filter set ex 500 em 550 (YFP)
X4993	ClonePix FL filter set ex 530 em 590 (CloneDetect 549, Rhodamine)
X4992	ClonePix FL filter set ex 622 em 700 (CloneDetect 622, Cy5)



# Reagents and Supplies

Please refer to the Genetix website for the latest reagents and supplies [www.genetix.com](http://www.genetix.com)

## CloneDetect Detection Reagents

Cat No.	Description	Pack Size
K8200	CloneDetect anti-human detection agent. FITC label. Sterile, azide free.	10000U / 1ml
K8201	CloneDetect anti-human detection agent. FITC label. Sterile, azide free. In Atomizer applicator	10000U / 5ml
K8210	CloneDetect anti-human detection agent. 549 label. Sterile, azide free.	10000U / 1ml
K8211	CloneDetect anti-human detection agent. 549 label. Sterile, azide free. In Atomizer applicator	10000U / 5ml
K8212	CloneDetect anti-human detection agent. 649 label. Sterile, azide free.	10000U / 1ml
K8213	CloneDetect anti-human detection agent. 649 label. Sterile, azide free. In Atomizer applicator	10000U / 5ml
K8215	CloneDetect anti-human CIF (Complex Initiation Factor)	10000U / 1ml
K8205	CloneDetect anti-human detection agent. Gamma chain specific. FITC label. Sterile, azide free.	10000U / 1ml
K8206	CloneDetect anti-human detection agent. Gamma chain specific. FITC label. Sterile, azide free. In Atomizer applicator	10000U / 5ml
K8252	CloneDetect anti-human detection agent. Kappa chain specific. FITC label. Sterile, azide-free.	10000U / 1ml
K8250	CloneDetect anti-human detection agent. Kappa chain specific. 549 label. Sterile, azide-free.	10000U / 1ml
K8251	CloneDetect anti-human detection agent. Kappa chain specific. 649 label. Sterile, azide-free.	10000U / 1ml
K8255	CloneDetect anti-human detection agent. IgM specific. FITC label. Sterile, azide-free.	10000U / 1ml
K8253	CloneDetect anti-human detection agent. IgM specific. 549 label. Sterile, azide-free.	10000U / 1ml
K8254	CloneDetect anti-human detection agent. IgM specific. 649 label. Sterile, azide-free.	10000U / 1ml
K8220	CloneDetect anti-mouse detection agent. FITC label. Sterile, azide free.	10000U / 1ml
K8221	CloneDetect anti-mouse detection agent. FITC label. Sterile, azide free. In Atomizer applicator	10000U / 5ml
K8230	CloneDetect anti-mouse detection agent. 549 label. Sterile, azide free.	10000U / 1ml
K8231	CloneDetect anti-mouse detection agent. 549 label. Sterile, azide free. In Atomizer applicator	10000U / 5ml
K8232	CloneDetect anti-mouse detection agent. 649 label. Sterile, azide free.	10000U / 1ml
K8233	CloneDetect anti-mouse detection agent. 649 label. Sterile, azide free. In Atomizer applicator	10000U / 5ml
K8225	CloneDetect anti-mouse detection agent. Gamma chain specific. FITC label. Sterile, azide free.	10000U / 1ml
K8226	CloneDetect anti-mouse detection agent. Gamma chain specific. FITC label. Sterile, azide free. In Atomizer applicator	10000U / 5ml
K8235	CloneDetect anti-mouse CIF (Complex Initiation Factor)	10000U / 1ml
K8240	CloneDetect anti-rat detection agent. FITC label	10000U / 1ml
K8300	LiveDetect Green (494nm Ex/ 517nm Em). Sterile. In Atomizer applicator	50ul (for 5ml)



## CloneMatrix

Cat No.	Description	Pack Size
K8510	CloneMatrix	1 x 40ml (100ml final media volume)
K8500	CloneMatrix	6 x 40ml (6 x 100ml final media volume)
K8530	CloneMatrix: optimized for CHO cells	1 x 40ml (100ml final media volume)
K8520	CloneMatrix: optimized for CHO cells	6 x 40ml (6 x 100ml final media volume)

## CloneMedia and XP Media

Cat No.	Description	Pack Size
K8610	CloneMedia (semi-solid media for hybridomas/myelomas)	1 x 90ml
K8600	CloneMedia (semi-solid media for hybridomas/myelomas)	6 x 90ml
K8640	CloneMedia-G (glutamine free semi-solid media for hybridomas/myelomas)	1 x 90ml
K8630	CloneMedia-G (glutamine free semi-solid media for hybridomas/myelomas)	6 x 90ml
K8685	CloneMedia-HEK (semi-solid media for serum-free HEK 293 cells)	1 x 90ml
K8680	CloneMedia-HEK (semi-solid media for serum-free HEK 293 cells)	6 x 90ml
K8710	CloneMedia-CHO (semi-solid media for CHO-s, CHOK1 and DG44 cells)	1 x 90ml
K8700	CloneMedia-CHO (semi-solid media for CHO-s, CHOK1 and DG44 cells)	6 x 90ml
K8740	CloneMedia-CHO-G (glutamine free semi-solid media for CHO-s, CHOK1 and DG44 cells)	1 x 90ml
K8730	CloneMedia-CHO-G (glutamine free semi-solid media for CHO-s, CHOK1 and DG44 cells)	6 x 90ml
K8725	CloneMedia-CHOK1SV (semi-solid media for CHOK1SV cells; glutamine-free)	1 x 90ml
K8720	CloneMedia-CHOK1SV (semi-solid media for CHOK1SV cells; glutamine-free)	6 x 90ml
K8650	XP Media (liquid media for cell line expansion of hybridoma/myeloma cells)	500ml
K8660	XP Media-G (Glutamine-free liquid media for cell line expansion of hybridoma/myeloma cells)	500ml
K8690	XP Media-HEK (liquid media for cell line expansion of suspension HEK cells)	500ml
K8750	XP Media-CHO (liquid media for cell line expansion of CHO-S cells)	500ml
K8760	XP Media-CHO-G (Glutamine-free liquid media for cell line expansion of CHO-S cells)	500ml



## PetriWell Cell Culture Plates

Cat No.	Description	Pack Size
W1000	PetriWell-1 Plate. Black with clear base. Polystyrene. TC treated	1/40
W1005	PetriWell-1 Plate. Black with clear base. Polystyrene. Non TC treated	1/40
W1007	PetriWell-1 Plate. Black with clear base. Polystyrene. Collagen coated	1/40
W1009	PetriWell-1 Plate. Black with clear base. Polystyrene. Poly-D-Lysine coated	1/40
W1050	PetriWell-1 Plate. Black with clear base. EquiGlass. TC treated	1/40
W1055	PetriWell-1 Plate. Black with clear base. EquiGlass. Non TC treated	1/40
W1055BC	PetriWell-1 Plate. Black with clear base. EquiGlass. Non TC treated. Bar-coded.	1/40
W1057	PetriWell-1 Plate. Black with clear base. EquiGlass. Collagen coated	1/40
W1059	PetriWell-1 Plate. Black with clear base. EquiGlass. Poly-D-Lysine coated	1/40
W1100	PetriWell-6 Plate. Black with clear base. Polystyrene. TC treated	1/40
W1105	PetriWell-6 Plate. Black with clear base. Polystyrene. Non TC treated	1/40
W1107	PetriWell-6 Plate. Black with clear base. Polystyrene. Collagen coated	1/40
W1109	PetriWell-6 Plate. Black with clear base. Polystyrene. Poly-D-Lysine coated	1/40
W1150	PetriWell-6 Plate. Black with clear base. EquiGlass. TC treated	1/40
W1155	PetriWell-6 Plate. Black with clear base. EquiGlass. Non TC treated	1/40
W1155BC	PetriWell-6 Plate. Black with clear base. EquiGlass. Non TC treated. Bar-coded.	1/40
W1157	PetriWell-6 Plate. Black with clear base. EquiGlass. Collagen coated	1/40
W1159	PetriWell-6 Plate. Black with clear base. EquiGlass. Poly-D-Lysine coated	1/40
W1500	PetriWell-96 Plate. Black with clear base. Polystyrene. TC treated	1/40
W1505	PetriWell-96 Plate. Black with clear base. Polystyrene. Non TC treated	1/40
W1507	PetriWell-96 Plate. Black with clear base. Polystyrene. Collagen coated	1/40
W1509	PetriWell-96 Plate. Black with clear base. Polystyrene. Poly-D-Lysine coated	1/40
W1510	PetriWell-96 Plate. Clear. Polystyrene. TC treated	1/40
W1515	PetriWell-96 Plate. Clear. Polystyrene. Non TC treated	1/40
W1515BC	PetriWell-96 Plate. Clear. Polystyrene. Non TC treated. Bar-coded.	1/40
W1517	PetriWell-96 Plate. Clear. Polystyrene. Collagen coated	1/40
W1519	PetriWell-96 Plate. Clear. Polystyrene. Poly-D-Lysine coated	1/40
W1550	PetriWell-96 Plate. Black with clear base. EquiGlass. TC treated	1/40
W1555	PetriWell-96 Plate. Black with clear base. EquiGlass. Non TC treated	1/40
W1557	PetriWell-96 Plate. Black with clear base. EquiGlass. Collagen coated	1/40
W1559	PetriWell-96 Plate. Black with clear base. EquiGlass. Poly-D-Lysine coated	1/40

**Other bar-coded plates are available. Please enquire.**



## Other

Cat No.	Description	Pack Size
K2505	aQu Clean pin cleaning solution	1L
K8080	Genetix Sterilizing Agent (1L per Sachet)	10
K8085	Genetix Sterilizing Agent (1L per Sachet)	50
K8150	CaliBeads: Fluorescent beads for ClonePix FL. 200µm diameter. Pan-wavelength.	100ml
K8010	Adherent Cell Picking Reagent – Type A	1 x 500ml
K8020	Adherent Cell Picking Reagent – Type B	1 x 500ml
K8030	Adherent Cell Picking Reagent – Type C	1 x 500ml
K8040	Adherent Cell Picking Reagent – Type D	1 x 500ml
K8005	Adherent Cell Picking Reagent Test Kit Types A – D	4 x 250ml
K8100	ProbeClean: Fluorescently labeled Antibody Clean-up Columns	50



# Troubleshooting

## Common Problems

Problem	Possible Solutions
<b>Machine will not turn on</b>	<ul style="list-style-type: none"> <li>- Check that main power switch is turned on, the reset button is pressed and the emergency stop button is released (pulled out)</li> </ul>
<b>Computer will not start</b>	<ul style="list-style-type: none"> <li>- Check that PC power is turned on</li> </ul>
<b>One or more of the axes won't move</b>	<ul style="list-style-type: none"> <li>- Check that the main power switch is turned on and the red reset button is pressed</li> <li>- Manually move the actuator to the middle of the bed</li> <li>- Disconnect and reconnect control cable between PC and right side of ClonePix FL (a small screwdriver may be necessary).</li> <li>- Re-boot ClonePix FL</li> </ul>
<b>Interior light or UV germicidal lamp will not turn on</b>	<ul style="list-style-type: none"> <li>- Check that the bulbs are not burned out</li> </ul>
<b>Picking alignment incorrect</b>	<ul style="list-style-type: none"> <li>- Ensure that pins are correctly aligned. Check for any bent pins and replace if necessary</li> </ul>
<b>Silicon tubing becomes detached from pin during purge</b>	<ul style="list-style-type: none"> <li>- Pin may be blocked. Replace with new pin</li> </ul>
<b>Water is leaking from picking head or actuator</b>	<ul style="list-style-type: none"> <li>- Pin may be blocked. Replace with new pin</li> </ul>
<b>Poor picking results</b>	<ul style="list-style-type: none"> <li>- Air in system. Purge the supply line</li> <li>- Check Z height of pin</li> </ul>
<b>Not depositing</b>	<ul style="list-style-type: none"> <li>- Pin blocked – run Purge option or replace pin</li> <li>- Dispense volume too low</li> </ul>
<b>No liquid flow to Wash Station</b>	<ul style="list-style-type: none"> <li>- System fluid supply bottle is empty</li> <li>- Check air supply and liquid pipes for kinks</li> <li>- Check outputs in configuration are correct (consult Genetix Customer Support)</li> </ul>
<b>Wash Station overflowing</b>	<ul style="list-style-type: none"> <li>- Check no kinks in tubing to waste bottle</li> <li>- Waste bottle full and/or vacuum pump broken</li> </ul>
<b>Pins are catching on holes of the wash station</b>	<ul style="list-style-type: none"> <li>- Datum point not set accurately.</li> <li>- Pins are damaged</li> <li>- Pin fitted with 2 O-rings</li> </ul>
<b>Water is leaking from top of pins</b>	<ul style="list-style-type: none"> <li>- Check each pin is fitted with one o-ring</li> </ul>
<b>Pins not firing correctly</b>	<ul style="list-style-type: none"> <li>- Check that air compressor is working</li> <li>- Pistons may have accumulated residue. Run Pin Fire Test for up to 1 hour. Do not undertake a Pick Run if pins not firing correctly</li> </ul>
<b>Illumination cover not opening closing correctly</b>	<ul style="list-style-type: none"> <li>- Check that air compressor is working</li> </ul>
<b>No ethanol flow to Replenishing Ethanol Wash Bath</b>	<ul style="list-style-type: none"> <li>- Check no kinks in ethanol supply tubing</li> <li>- Peristaltic pump tubing has become blocked (usually after period of inactivity)</li> </ul>
<b>Replenishing Ethanol Wash Bath overflowing</b>	<ul style="list-style-type: none"> <li>- Check no kinks in ethanol waste tubing</li> <li>- Peristaltic pump tubing has become blocked (usually after period of inactivity)</li> </ul>





# Glossary of Terms

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## Barcode

A unique label for source and destination microplates. Recommended barcoded plate types for colonies suspended in semi-solid medium are PetriWell-1 plates (Catalogue number W1055BC) and PetriWell-6 plates (Catalogue number W1155BC)

## Colony

A clonal group of cells, typically of mammalian origin, that have grown either adherently or suspended in semi-solid medium.

## Datum Point

A series of X, Y, Z co-ordinates that define a set position on the Robot bed.

## Destination plate

96-well microplate(s) prefilled with liquid medium to collect picked colonies.

## Dispersal

Dispersal Option separates out the cells of a picked colony by aspirating and dispensing in the destination plate.

## Epi-illumination

The white light option normally used for configuring the robot and for visualising colonies during picking, using LEDs located under the source plate being imaged.

## EquiGlass

A high quality polymer used as the base material for Genetix PetriWell plates. It has excellent properties for optimal fluorescent imaging.

## Halogen dryer

Proprietary ultra-high temperature dryer used as part of the Pin Sanitise system.

## Image Acquisition

The capturing of images using pre-defined Acquisition Options.

## Image Archive

Default location for Pick Run and Imaging Run images and data. Accessible via Review Results.

## LED intensity

ClonePix FL uses only LEDs for consistent and reliable imaging. The intensity of the LEDs can be adjusted by the user to control image exposure under the Acquisition tab.

## LIMS

Laboratory Information Management System.

## LiveDetect

A reagent for visualising only live cells. Can be used as a fluorescent alternative to imaging colonies by white light. Catalogue number K8300.

## .gfp file

Format used to save a Process.

## .gft file

Format used to save a Process Template.

## Interior Light

Illuminates the interior of the instrument. Can be activated or deactivated at any time using the



Interior Light icon in the bottom right corner of the screen. Interior Light is not used for imaging and will automatically switch off during imaging

### **PetriWell-1 plate**

Genetix single well plate optimized for visualizing plated colonies. The non-treated type (Catalogue number W1055) are recommended for colonies suspended in semi-solid medium. The TC-treated type (Catalogue number W1050) are recommended for colonies grown as adherent monolayers.

### **PetriWell-6 plate**

Genetix 6 well plate optimized for visualizing plated colonies. The non-treated type (Catalogue number W1155) are recommended for colonies suspended in semi-solid medium. The TC-treated type (Catalogue number W1150) are recommended for colonies grown as adherent monolayers.

### **Picking Pins**

Reusable stainless steel tools used to collect colonies. F1 pins have an internal tip diameter of 400µm and are for picking suspended colonies. F2 pins have an internal tip diameter of 700µm and are for picking adherent colonies (monolayers).

### **Primary Pin**

The picking pin nearest the front of the robot. All other pins are aligned relative to this one.

### **Prime Configuration**

The Acquisition Option that will be used for colony detection. Normally this is based on white light imaging.

### **Prime Probe**

The type of illumination that will be used for colony detection. Normally, this will be white light by transillumination (trans). The Prime Probe is set up by creating a Prime Configuration.

### **Process**

A standard program for ClonePix FL to carry out a task such as a series of similar experiments, or a maintenance task. A Process is saved as a .gfp file.

### **Proximity Indicators**

Red lines between colonies on the image that show the nearest neighbour for each colony. Note: This feature is not the same as the colony exclusion feature in Groups.

### **Remote Data Viewer**

An optional software program (order code: SL4950-A01) for accessing ClonePix FL results remotely. Please contact Customer Support for further information.

### **Semi-solid medium**

A viscous cell culture medium such as CloneMedia used to immobilize cells in suspension to permit growth of clonal colonies.

### **Source plate**

One- or 6-well microplate(s) containing colonies for picking.

### **Sterilizing Agent**

Recommended for sterilizing ClonePix FL and its components and accessories. Catalogue number K8080.

### **Template**

A program from which Processes can be generated. A Template is saved as a .gft file.

### **Transillumination**

The white light option normally used to detect colonies using LEDs positioned on the robot head.



**Wash bottle**

4 liter bottle of sterile water used to purge the fluid system (1 liter in some older systems).

**Waste bottle**

4 liter bottle used to collect purged fluid (1 liter in some older systems).

**White Light**

Full spectrum LED illumination, of which there are two options: Transillumination (Trans) is normally used to detect colonies. Epi-illumination is normally used for configuring the robot and for visualising colonies during picking.

**X Drive**

Robot axis running from right to left.

**XML**

Extensible Markup Language. A simple text format derived from SGML Originally designed to meet the challenges of large-scale electronic publishing, XML is also used in the exchange of a wide variety of data on the Web.

**Y Drive**

Robot axis running from back to front.

**Z Drive**

Robot axis running vertically from high to low on the Robot bed.



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