



isoHub user manual

For software versions 2.1.0 and 2.1.1



Products bearing the symbol of a strikethrough refuse bin must not be disposed of along with unsorted refuse.

For details on how to dispose of your isoHub at the end of its useful life, see section [12](#).

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult iotaSciences for further help.

FCC CAUTION: Any changes or modifications to the isoHub other than those shown in the manual, demonstrated during training, or directed by iotaSciences authorised personnel may void compliance and the user's authority to operate the isoHub.



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Acknowledgements:

Sections of this manual have been taken from the Evident CKX53 microscope manual, with kind permission of Evident.

1 Introduction

The isoHub works with the isoCell as part of the iotaSciences' Cloning Platform to track colonies in a GRID through the single-cell cloning workflow. The controller and automated stage make it easy to review chambers in a GRID and tag chambers to include in the next step of the cloning workflow, from identifying chambers containing single-cells (monoclonal chambers), to selecting colonies ready to extract from the GRID.

The isoHub manages all the user dish data in the system and automatically syncs the data wirelessly with linked isoCells when needed to run programs.

2 Safety instructions

Use the isoHub with care, and take the following precautions:

- Only use the isoHub once you have read and understood this manual. Ensure this manual is accessible for all users, and that each potential user reads and understands it.
- If the isoHub is used in a manner not specified by the manufacturer, then the protection provided by the isoHub may be impaired.
- Powering the equipment:
 - Use only with the supplied *XP-POWER VEC50US24* (24VDC, 50W) power supply and power cord.
 - Connect power supply to a suitable AC mains supply with voltage in range 90 – 260V; 50 – 60Hz; minimum current 1A at 115V, 0.7A at 230V.
 - The AC mains socket shall act as the disconnect device and be readily accessible.
- Avoid subjecting the isoHub to impact and vibration.
- Keep the original packaging the isoHub came in and use this when transporting the isoHub.
- Do not connect cables in ways other than those mentioned in this manual. Different connections may cause damage and fire.
- Do not alter the isoHub in any manner, other than those shown in the manual, demonstrated during training, or directed by iotaSciences.
- Only use the isoHub when it is set on top of a safe, flat and stable horizontal surface.
- If water or other liquid has been spilled near the isoHub, safety may be compromised. Ensure that no spilled liquid has been in contact with or entered the isoHub.

- If water or other liquid enters the isoHub, stop using it immediately and unplug the power supply. Continued use may cause a fire. Contact iotaSciences for actions or precautions.
- If any foreign object enters the isoHub, safety may be compromised. Contact iotaSciences for actions or precautions.
- Unplug the isoHub immediately if it smokes or produces a strange odour or unusual noise. Continued use may cause a fire. Contact iotaSciences for actions or precautions.
- Do not autoclave the isoHub.
- The isoHub is for indoor use only.
- The isoHub is designed to work in the following operating environment (operating outside these limits may degrade performance and damage the isoHub):
 - Ambient temperature: 16 – 35°C (60 – 95°F)
 - Humidity: 40 – 60%
 - Altitude: less than 2000m
 - Pollution degree 2
- All services shall be performed by iotaSciences authorised personnel only.
- Do not look directly into the LED light source and be careful when looking down the eyepiece that the LED isn't set too bright.
- If attaching a camera to the isoHub, ensure the isoHub doesn't become unstable.
- External influences such as electrostatic discharge may cause this equipment to malfunction. In this case, please disconnect the power and reconnect.

3 Getting started

3.1 Familiarisation

Users should familiarise themselves with the key components of the isoHub prior to use:

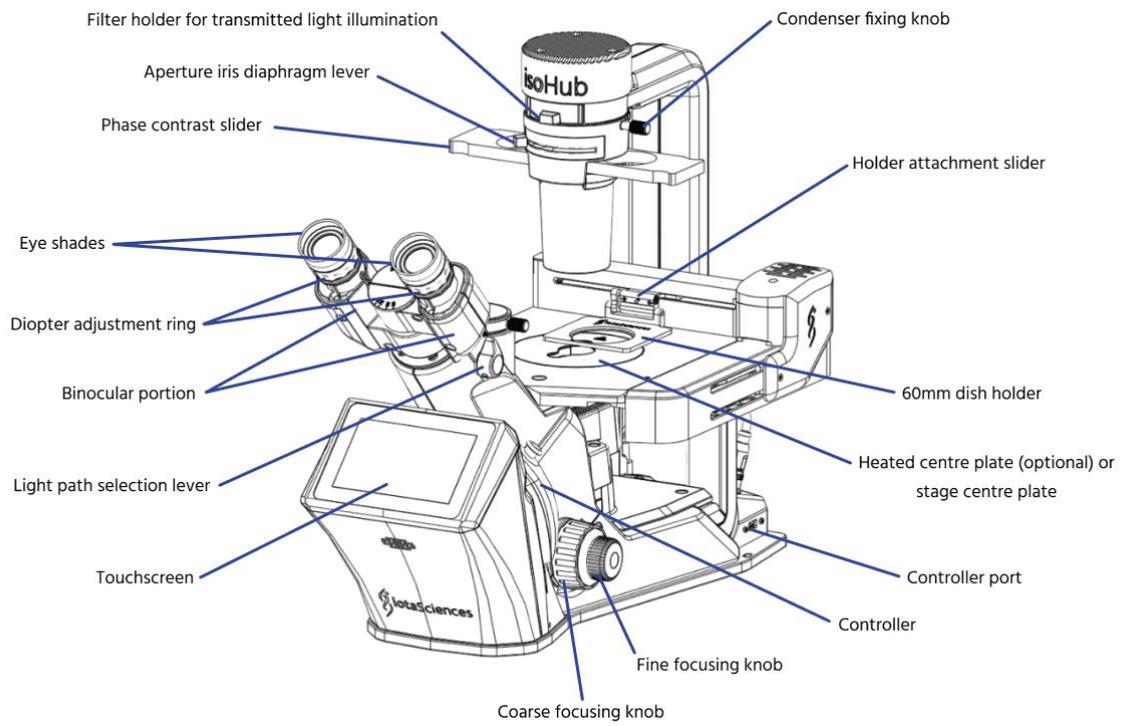


Figure 1: Front view showing key components of the isoHub.

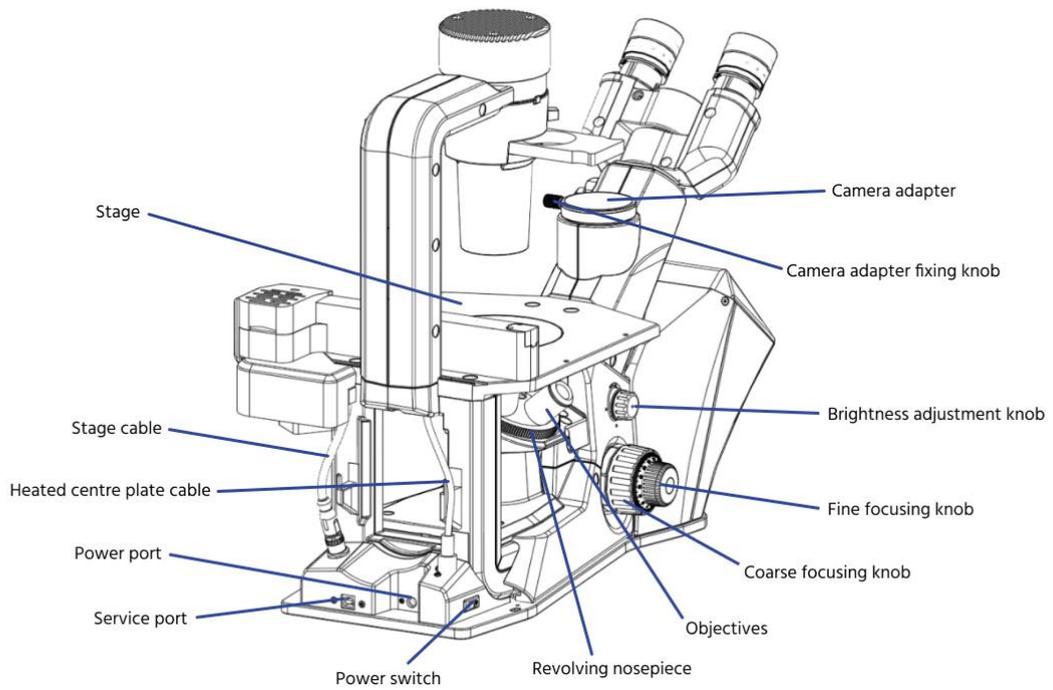
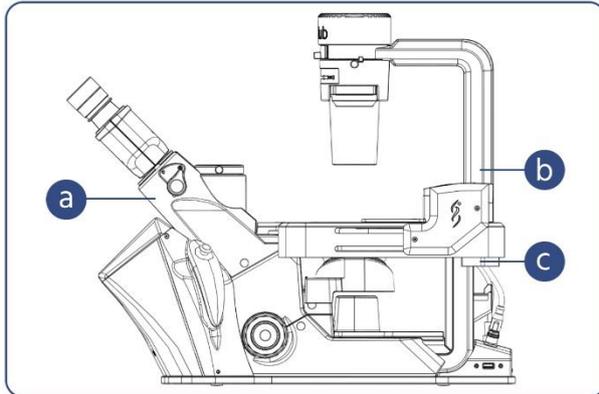


Figure 2: Back view showing key components of the isoHub.

3.2 Installation

3.2.1 Remove isoHub from packaging and place on a flat stable surface



When carrying the isoHub to a different location, remove all cables and units in advance.

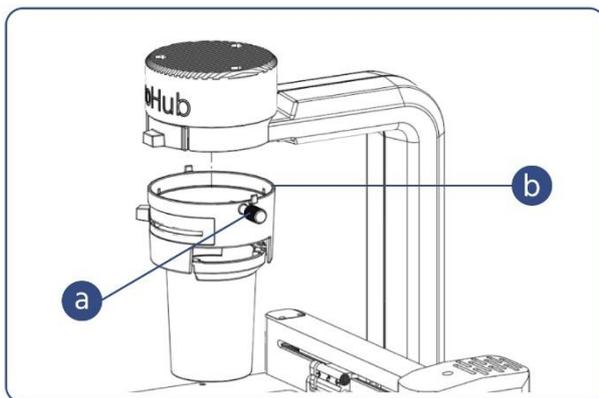
Hold the lower area **[a]** of the binocular portion above the touchscreen and the lower part of the column **[b]** or the hand grip **[c]** at the bottom of the column, and install the isoHub at the predefined location. Alternatively, slide the

isoHub off the table and lift from under the base of the isoHub.

| | |
|--|---|
|  | Do not manoeuvre by holding the eyepieces, light source, stage or the focusing knobs, as this may cause damage to the isoHub. |
|  | Do not carry the isoHub with a specimen on the stage. |

3.2.2 Attach the condenser portion

| | |
|---|---|
|  | If using the isoHub with the fluorescence option, then attach the umbra shield to the condenser portion before attaching the condenser portion to the isoHub – see the isoHub fluorescence user guide available from the iotaSciences customer portal for more details. |
|---|---|



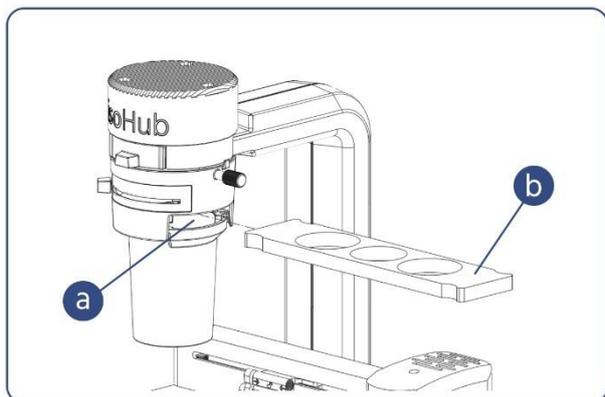
Loosen the condenser fixing knob **[a]** to the extent that it does not fall off.

Hold the condenser diagonally, contact the attaching portion on the top surface **[b]** of the condenser to the round dovetail portion on the bottom of the column and fit it.

Rotate the condenser and set the condenser fixing knob **[a]** at the right-side position

approximately. Then, tighten the condenser fixing knob **[a]** to secure it.

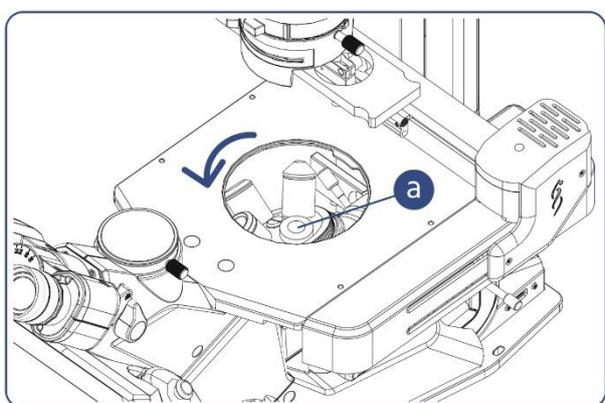
3.2.3 Insert phase contrast slider



Set the phase contrast slider **[b]** with the surface where the texts are described facing up and insert it in the phase contrast slider hole **[a]** of the condenser portion.

Align the empty hole in the light path for bright field observation, or the pre-centred phase contrast ring for phase contrast observation.

3.2.4 Attach objectives



Remove the stage centre plate or the heated centre plate - if using the heated centre plate, then first ensure the isoHub is powered off before detaching the heated centre bed cable from the back of the isoHub (see [Figure 2](#)).

Attach the objectives to the revolving nosepiece. It is recommended to insert the objectives into the revolving nosepiece so that

the magnification increases clockwise when viewing the revolving nosepiece from above.

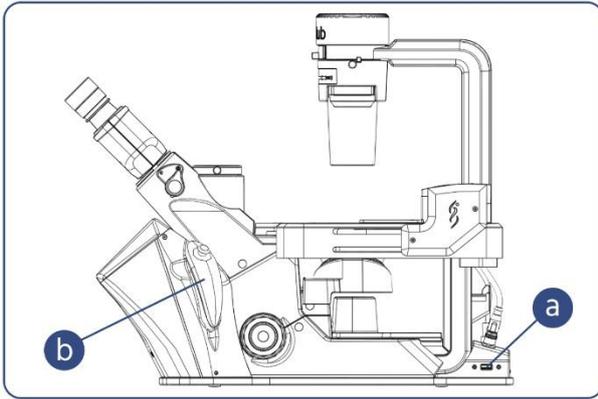
Attach caps to screw holes **[a]** of the revolving nosepiece where no objectives are attached to avoid dust or dirt getting on the lenses.

After all objectives and caps are attached, fit the stage centre plate or the heated centre plate into the stage. If using the heated centre plate, then reconnect the heater cable at the back of the isoHub.



When removing the objectives, follow the procedures opposite to those of attaching.

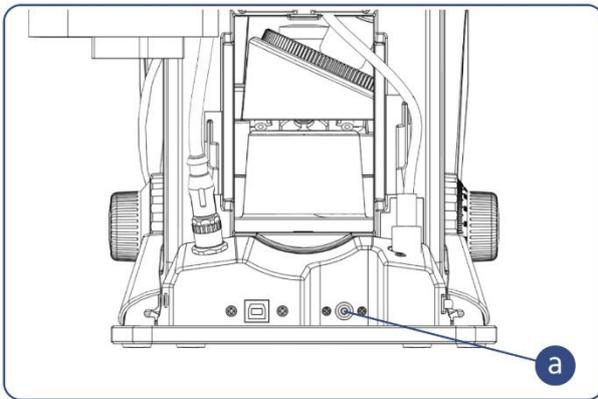
3.2.5 Attach controller



Insert controller cable into the controller USB port **[a]** at the back of the isoHub.

Insert the controller into the cradle **[b]** to the right of the touch screen.

3.2.6 Insert power cord

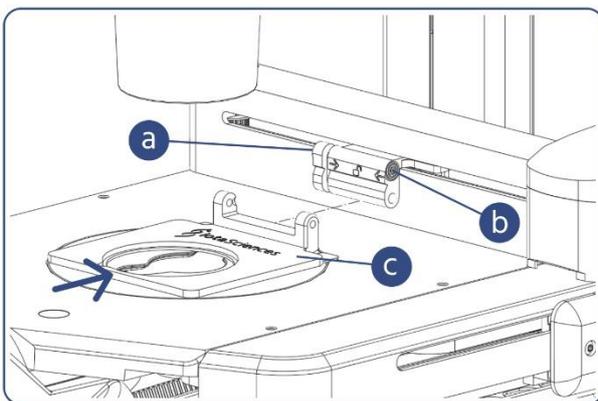


Insert power cable into the power supply.

Insert the cable from the power supply into the power port **[a]** at the rear of the isoHub.

Connect the power supply's plug to the power outlet.

3.2.7 Attach 60mm dish holder or well plate holder



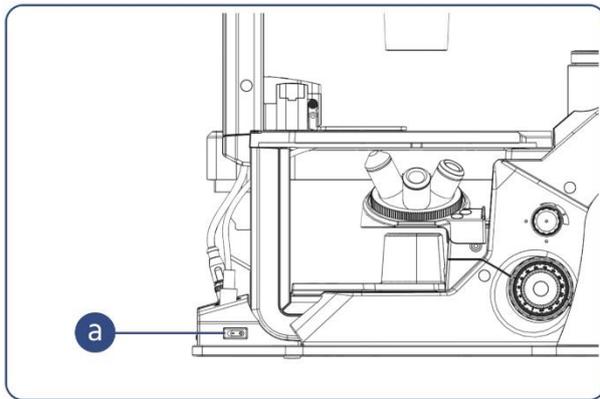
Press points **[a]** and **[b]** together.

Slide the 60mm dish holder **[c]** or the well plate holder into position and release points **[a]** and **[b]**.

Ensure the 60mm dish holder or well plate holder is flat on the stage.

4 Using the isoHub

4.1 Powering-on



To power-on the isoHub, ensure that it is connected to a suitable mains power socket by the supplied mains power cable and 24V power supply (see Section [3.2.6](#)). Push the power switch to the on position (located at the back of the isoHub on the left-hand side).

After a few seconds, the isoHub touchscreen will display the home screen (see [Figure 3](#)).

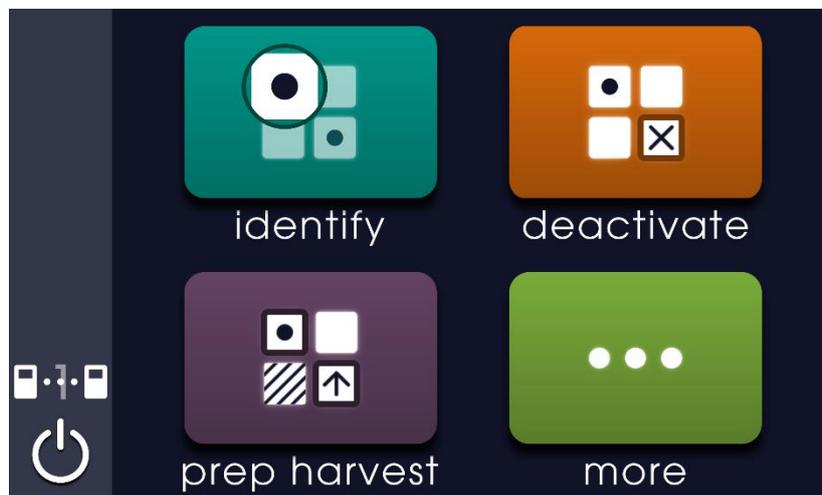


Figure 3: isoHub home screen

4.2 Moving the stage

While the isoHub is showing the home screen ([Figure 3](#)) or a sub-menu screen, the controller can be used to move the 60mm dish holder or well-plate holder around the stage in order to view different parts of the dish or well plate.

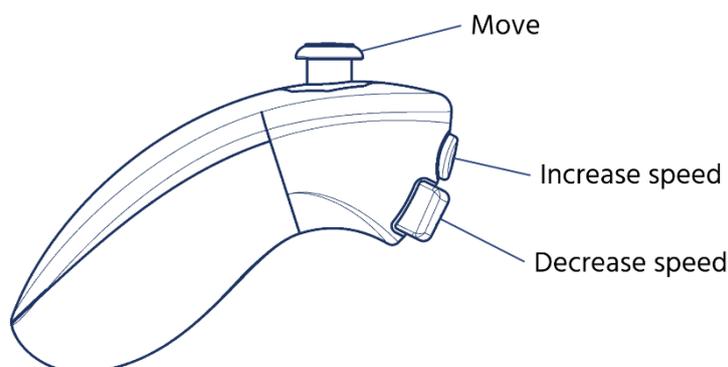


Figure 4: Controller controls when moving stage outside a program

The buttons on the controller can be used to change the speed that the stage will move around at. The upper button will increase the speed while the lower button decreases the speed (see [Figure 4](#)).

4.3 Running programs

The programs on the isoHub can be used to scan through the chambers in a GRID made with an isoCell, and change the state of individual chambers. For example, the [Identify](#) program can be run to review the chambers in a recently plated GRID, and mark chambers containing single cells (monoclonal chambers).



Ensure the 60mm dish holder is attached to the isoHub before starting a program.

Running a program works as follows:

1. *Select user.* If the user is using the isoHub for the first time, they will have to enter a new username at this point (only available in the [identify](#) program).
2. *Select colour.* The user needs to select the colour of the locating ring attached to their dish. Each colour is assigned a number of dots, which corresponds to the number of notches on the locating ring on the dish.
3. *Place dish in 60mm dish holder.* Ensure that the triangular protrusion of the locating ring fits into the triangular notch of the 60mm dish holder. Press the  button to continue.
4. *Select chambers.* A screen like that in [Figure 5](#) will appear on the touch screen, and the dish holder will move so that the first available chamber of the GRID is in view.

In each program, chambers that are available to be viewed and edited will depend on the program being run. See section [0](#) for more details on each program.

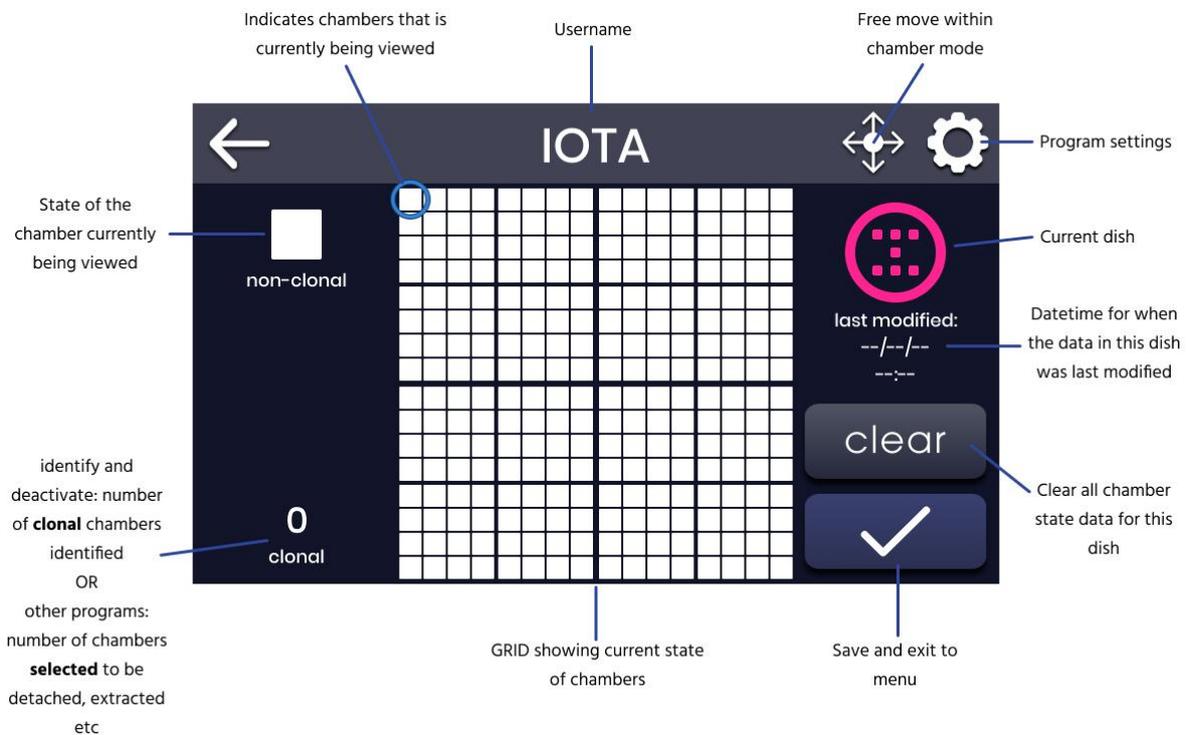


Figure 5: *Identify* screen showing a blank dish (user IOTA's PINK dish) before identifying monoclonal chambers.

The chamber that is currently being viewed is indicated on the touchscreen by a blue circle - in the above example, the isoHub is viewing chamber A01. A larger icon to the left of the GRID shows the state of the chamber that is currently being viewed. For example, in [Figure 5](#), we are currently viewing chamber A01 which is in a non-clonal state. See section [4.4](#) for a full list of chamber states.

| | |
|---|---|
|  | <p>All programs on the isoHub require the user to select a username and dish colour. The isoHub supports up to thirty-six users. Under each username, the isoHub can simultaneously track up to nine individual dishes via the dishes' coloured locating rings. Stored user data can be managed via the Data program.</p> |
|---|---|

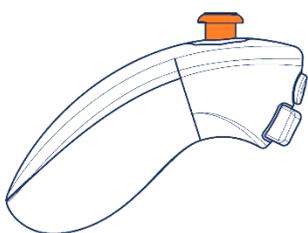
4.4 Chamber states

As a dish progresses through the workflow, the Cloning Platform tracks the state of the chambers. The current chamber states for a dish can be viewed at any time via the [Data](#) program.

The chamber states are:

| | |
|---|--|
|  | Non-clonal – Chamber contains either no cells or multiple cells. This is the default state – a chamber is assumed to be <i>non-clonal</i> until it is marked as <i>clonal unfilled</i> via the Identify program. |
|  | Clonal unfilled – Chamber contains a single cell (or its derivative monoclonal colony). Chamber volume is 200nl, indicating that the <i>Fill</i> program on the isoCell has not yet been run on the dish. |
|  | Clonal filled – Chamber contains a single cell (or its derivative monoclonal colony). Chamber volume is 600nl, indicating that the <i>Fill</i> program on the isoCell has been run on the dish. |
|  | Detached – Dissociation reagent has been administered to the chamber using the <i>Detach</i> program on the isoCell. |
|  | Harvested – The colony has been harvested from this chamber using the <i>Extract</i> program on the isoCell. |
|  | (Most recently) Harvested – The harvested chambers produced by the latest run of the <i>Extract</i> program on the isoCell are distinguished by a small circle in their corner. These chambers are the only ones that can be selected in the Prep Redetach program. |
|  | Inactive – The cell or colony in this chamber is no longer active in the single-cell cloning workflow. <i>Clonal filled</i> chambers can be marked as <i>inactive</i> , and <i>inactive</i> chambers can be re-activated to <i>clonal filled</i> state in the Deactivate program. |
|  | Unknown – The chamber is in an <i>unknown</i> state. This can happen if, for example, a program is cancelled while operating on the chamber. The <i>Recover</i> program on the isoCell can be used to attempt to return these chambers to a <i>clonal filled</i> state. |

4.5 Looking around a chamber



Whilst in a program, the joystick on the controller can be used to move to defined points in the chamber to allow viewing the extremities of the chamber. When the joystick is released, the dish holder will move so that the chamber is centred in the field of view again.



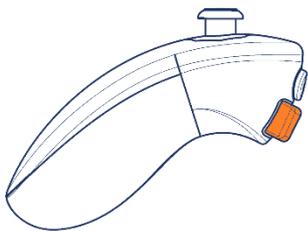
When the joystick is in the central position, the chamber should be centred in the field of view. If this is not the case, then you will need to run through a calibration program (see section [4.10.3](#)).

Alternatively, the controller can be used to move freely around the chamber by pressing the  button in the top right corner of the program screen. When in this mode, the joystick will move the dish holder around so that different areas of the chamber can be viewed, and the buttons will change the speed (see [Figure 4](#)). Releasing the joystick will not cause the dish holder to move back to the centre of the dish. To exit this mode, press anywhere on the touch screen (at this point, the dish holder will move so that the chamber is centred in the field of view again).



The direction the specimen moves in response to input from the joystick can be changed by going to the program settings and changing the invert options (see section [4.10.1](#)).

4.6 Moving to the next chamber



To move to the next available chamber without changing the state of that chamber, press the lower button on the controller. The chambers that are available to be viewed depends on the program that is being run on the isoHub – see the individual sections on each program in section [0](#) for more details.

For continuous scanning of chambers, press and hold the lower button on the controller.



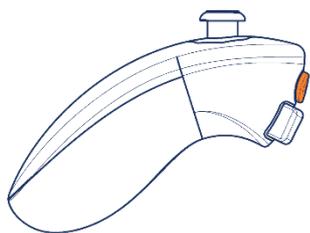
How long the isoHub will remain on each chamber whilst continuously scanning can be changed by going to the program options, and adjusting the speed slider (see section [4.10.2](#)).

4.7 Moving to the previous chamber

To move to the previous chamber, move the joystick over to the left and press the lower button on the controller simultaneously.

To move back more than one chamber, press and hold the lower button on the controller whilst keeping the joystick over to the left.

4.8 Changing chamber state



The upper button on the controller can be used to change the state of the chamber that is currently being viewed.

The state that the chamber will be changed to depends on the program being run - see the individual sections on each program in section [Q](#) for more details.

When changing the state of a chamber, the LED illumination will change colour and the dish holder will then move so that the next available chamber is visible.

4.9 Using the touchscreen to move between chambers and change states

Instead of using the controller to scan through chambers and change the state of chambers, the touchscreen can be used to jump directly to a chamber and to change the state of chambers.

On the screen in [Figure 5](#), click on the quadrant containing the chamber to move to. This will display a zoomed in view of that quadrant. Then click on the chamber to be viewed, and the dish holder will move so that that chamber is centred in the field of view. Clicking on the same chamber again will change the state of the chamber (the state change depends on the program being run).

4.10 Program settings

Some settings are available during a program, and are available by clicking the  button in the top right corner of the program screen ([Figure 5](#)).

4.10.1 Invert

This option will change the direction that the dish moves in response to input from the joystick.

4.10.2 Speed

This option will set how fast the isoHub scans through chambers when holding down the button on the joystick to jump between chambers.

4.10.3 Centre

If the chamber isn't centred in the field of view when looking through the eyepieces or via a camera, then the isoHub needs to be calibrated.

To do this, go to the program settings and follow the on-screen instructions.

4.11 Sleep mode

The isoHub will go to sleep after a certain amount of inactivity while on a menu screen. When this happens, the touch screen will dim and the LED illumination will turn off. Whilst in sleep mode, the

isoHub will still respond to requests to sync data with any isoCells that have been setup to do this with the isoHub.

The isoHub can also be put to sleep by pressing the  button in the bottom-left corner of a menu screen.

To wake the isoHub up, touch anywhere on the screen or press any button on the controller.

The amount of inactivity before the isoHub goes to sleep can be changed by going to *More* → *Settings* → *Options* (see section [6.2](#)). Sleep mode can be switched off by selecting 'OFF'.

4.12 Powering-off

To turn the isoHub off, first put the isoHub into sleep mode (see section [4.11](#)) before pushing the power switch to the off position (located at the back of the isoHub on the left-hand side). When not in use, the isoHub should be covered with the dust cover to prevent dust accumulating on the isoHub.

5 Workflow

5.1 Identify

Once cells have been plated into chambers on the isoCell, the chambers that contain single cells (clonal chambers) need to be identified.

This is done in the *Identify* program on the isoHub. The isoHub will move to each non-clonal chamber, and users can mark chambers containing single cells as unfilled clonal chambers (see section [4.8](#)).

To distinguish between chambers that are non-clonal or unfilled clonal, the LED illumination will be white when viewing non-clonal chambers and green when viewing unfilled clonal chambers.

5.2 Deactivate

During the Culture stage of the workflow (after clonal chambers have been filled on the isoCell), the isoHub can be used to view all clonal filled chambers by running the *Deactivate* program. Any chambers that are no longer of interest can be marked as inactive (see section [4.8](#)) and will no longer be included in the subsequent Cloning Platform workflow.

The isoHub will also move to chambers that have previously been marked as inactive (see section [4.8](#)), so that users can reactivate them and put them back into a filled clonal state. These chambers will again be available in the subsequent Cloning Platform workflow.

To distinguish between chambers that are filled clonal or inactive, the LED illumination will be white when viewing filled clonal chambers and blue when viewing inactive chambers.

5.3 Prep Detach

The *Prep Detach* program (*Prep Harvest* → *Prep Detach*) is used to select colonies in filled clonal chambers that are ready to be harvested. The chambers selected will have dissociation reagent applied to them during the *Detach* program on the isoCell (see section [4.8](#)). To harvest colonies without first adding dissociation reagent to the chambers, see the [Prep Extract](#) program.

The LED illumination will be white when reviewing the chambers and turn green for chambers that have been selected.

| | |
|---|--|
|  | <p>The <i>Prep Detach</i> program should not be run on a dish containing suspension cells – this would result in the cells being removed during the PBS washes when running the <i>Detach</i> program on the isoCell. For harvesting suspension cells, please see the Prep Extract program.</p> |
|---|--|

5.4 Prep Extract

The *Prep Extract* program (*Prep Harvest* → *Prep Extract*) is used to select chambers containing cells to be extracted from the dish during the *Extract* program on the isoCell (see section [4.8](#)).

It can be run after running the *Detach* program on the isoCell for adherent cells, or by itself for suspension cells.

5.4.1 Adhesion cells

If the dish contains chambers that have had dissociation reagent added to them, then the isoHub will move to all *detached* chambers during the *Prep Extract* program. Detached chambers will have been pre-selected to be extracted during the *Detach* program on the isoCell. The user can deselect chambers with colonies that aren't ready to be extracted. These colonies will then need to be reselected when they are ready to extract.

The LED illumination will be white when viewing chambers that have been marked as being ready for extraction, and blue for chambers that have been marked as not being ready for extraction.

5.4.2 Suspension cells

If the dish doesn't contain any chambers that have had dissociation reagent added to them, then the isoHub will move to all filled clonal chambers during the *Prep Extract* program, and users can mark which colonies are ready to be extracted.

The LED illumination will be white when viewing chambers not marked as being ready for extraction, and green for chambers that have been marked as being ready for extraction.

5.5 Prep Redetach

The *Prep Redetach* (*Prep Harvest* → *Prep Redetach*) program is used in cases where the user would like to repeat the *Extract* program on a chamber on the isoCell, for example, if cells in a chamber haven't fully been detached from the dish.

The user must select harvested chambers for re-detaching, and only chambers harvested in the latest run of the *Extract* program can be selected.

The LED illumination will be white when viewing chambers not marked for re-detaching, and green for chambers that have been marked for re-detaching.

6 Other programs

6.1 Data

The *data* program (*more* → *data*) enables the user to:

- Add or remove usernames.
- Erase individual dishes under a chosen username.
- View current chamber states (section [4.4](#)) of dishes under a chosen username.



Removing a username will erase all stored dish data for that username.

6.2 Options

The *options* program (*more* → *settings* → *options*) allows the user to:

- Adjust display screen brightness.
- Adjust volume.
- Invert the direction the dish/well plate holder moves in when using the controller.
- Turn bed heater on or off.
- Set the time before the isoHub goes to sleep (see section [4.11](#)).

6.3 Set time

The *set time* program (*more* → *settings* → *set time*) is used to update the date and time on the isoHub.

6.4 Data sync

The *data sync* program (*more* → *settings* → *data sync*) is for viewing the isoCells that the isoHub has been set up to sync data with as part of the iotaSciences' Cloning Platform. It also allows disabling data syncing with individual isoCells.

The isoHub can be setup to sync data automatically with up to four isoCells. This means that user data is available on the isoHub and any of the isoCells it is setup to sync data with.

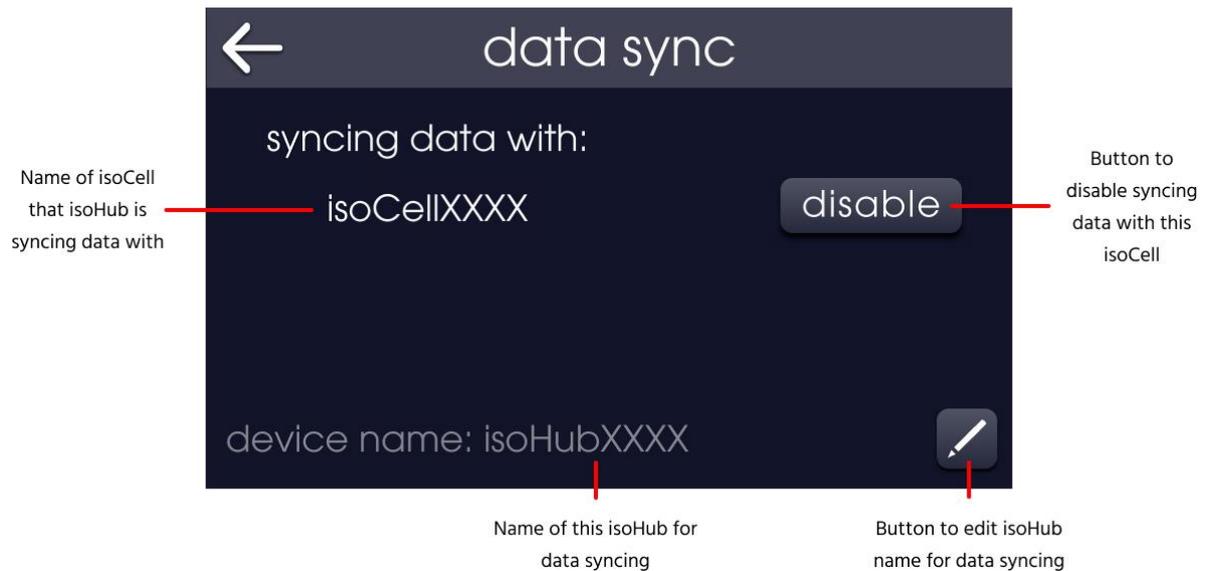


Figure 6: Data sync screen when data syncing with an isoCell is setup.

This information is also displayed by clicking on the icon above the shutdown icon on a menu screen - the table below shows the different icons and their meanings:

| | |
|---|--|
|  | <p>isoHub currently connected to an isoCell and syncing data. The number is the number of isoCells this isoHub is setup to sync data with (in this case, one isoCell).</p> |
|  | <p>isoHub setup to sync data with an isoCell, but not currently connected and syncing data. The number is the number of isoCells this isoHub is setup to sync data with (in this case, one isoCell).</p> |
|  | <p>isoHub isn't currently set up to sync data with any isoCells.</p> |

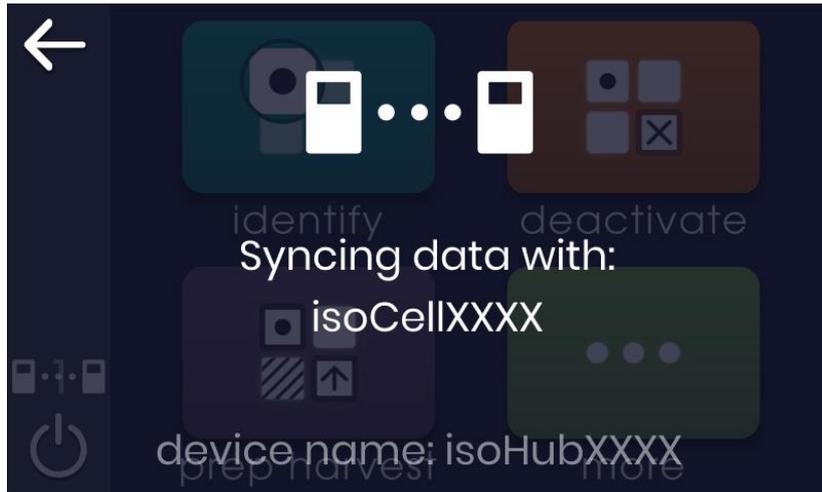


Figure 7: Data syncing status screen accessed by pressing the data syncing status icon on a menu screen.

| | |
|---|---|
|  | <p>The device name displayed at the bottom of both the Data Sync screen and the Data Sync status screen is the name of the isoHub that will be displayed on the isoCell. It can be edited by going to the Data Sync program and clicking the  button in the bottom right corner.</p> |
|---|---|

6.4.1 Setting up data syncing

| | |
|---|---|
|  | <p>When purchasing a Cloning Platform, the isoCell and isoHub will be set up to automatically sync data between them by default. Otherwise, please refer to the isoCell user manual for instructions on how to set up data syncing between and isoCell and an isoHub.</p> |
|---|---|

6.5 About

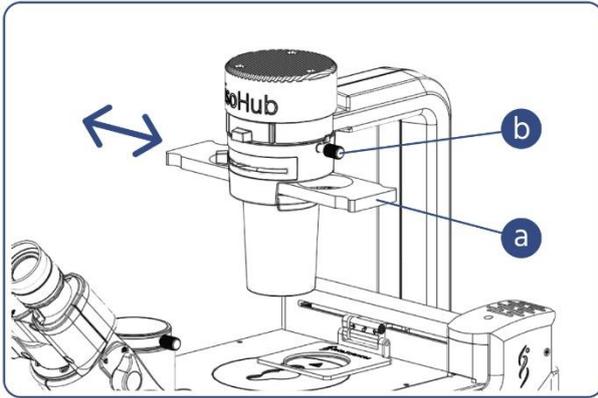
The *about* program (*more* → *about*) displays:

- The software version currently installed on the isoHub.
- Contact details for iotaSciences.

7 Bright field/phase contrast observation

| | |
|---|---|
|  | <p>If the isoHub is set up with fluorescence observation, then ensure the blank filter cube is engaged in the light path by moving the filter cube slider with the filter cube slider knob, and the umbra shield is moved out of the light path before continuing with bright field/phase contrast observation.</p> |
|---|---|

7.1 Changing between bright field and phase contrast observation



When performing phase contrast observation:

Slide the phase contrast slider **[a]** and engage the phase contrast ring placed at the centre of the slider in the light path.

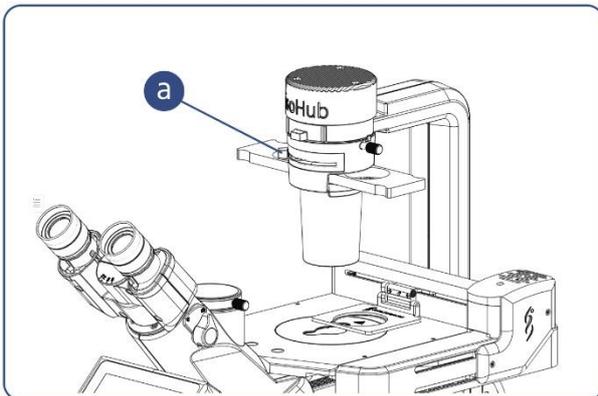
Loosening the condenser fixing knob **[b]** to rotate the condenser portion allows you to change the direction of the phase contrast slider within the range of +/-30deg. Select the

direction that makes it easy to observe.

When performing bright field observation:

Slide the phase contrast slider **[a]** and engage the empty hole of the slider in the light path.

7.2 Adjusting the aperture iris diaphragm



Rotate the aperture iris diaphragm lever **[a]** to adjust the aperture iris diaphragm.

○ : indicates the opening direction

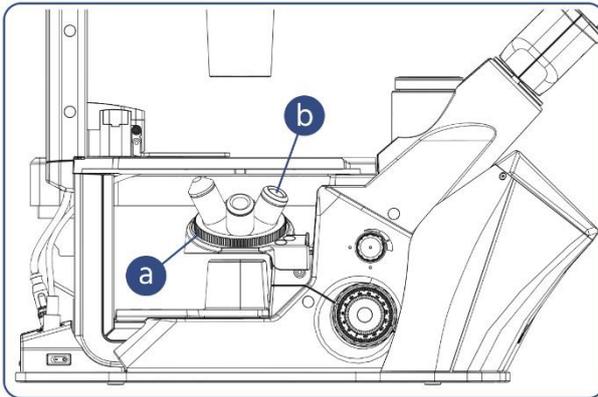
⊗ : indicates the closing direction

For the phase contrast observation, set the aperture iris diaphragm lever to open, ○.



If you cannot get sufficient contrast in phase contrast observation, you may be able to get a higher contrast image by narrowing down (adjust to closing direction, ⊗) the aperture iris diaphragm in the bright field observation depending on containers or specimens.

7.3 Selecting the objective

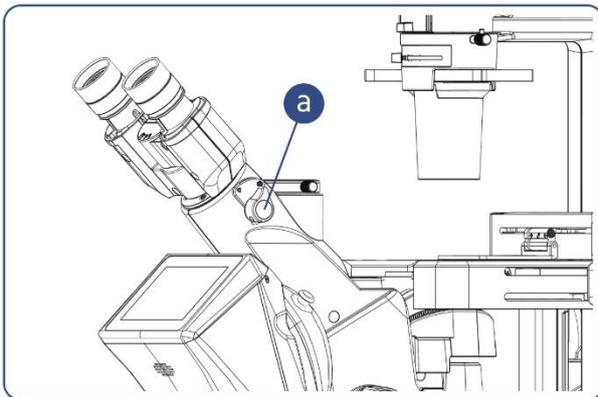


Rotate the revolving nosepiece **[a]** to engage the objective **[b]** with the magnification to be used for observation in the light path.



When changing the objective, be careful that the objective does not clash with the specimen. Lower the objectives with the focussing knobs before changing the objective.

7.4 Changing between visual light path and camera light path

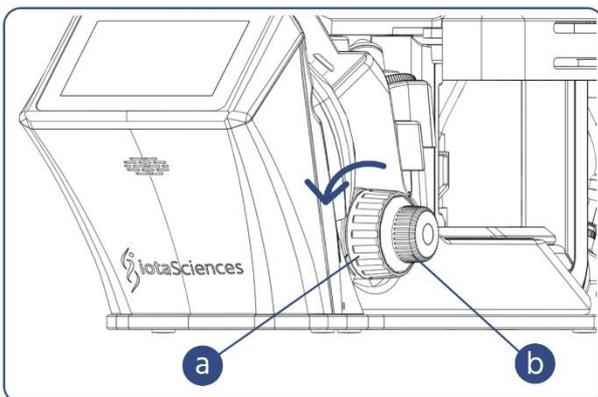


Set the light path selection lever to the visual light path for using the eyepiece, or camera light path for using a camera.

◀ : Visual light path 100%/Camera light path 0%

📷 : Visual light path 0%/Camera light path 100%

7.5 Focusing on the specimen



Rotate the coarse focusing knob **[a]** or the fine focusing knob **[b]** to bring the specimen into focus.

The same knobs are present on the other side of the isoHub as well.

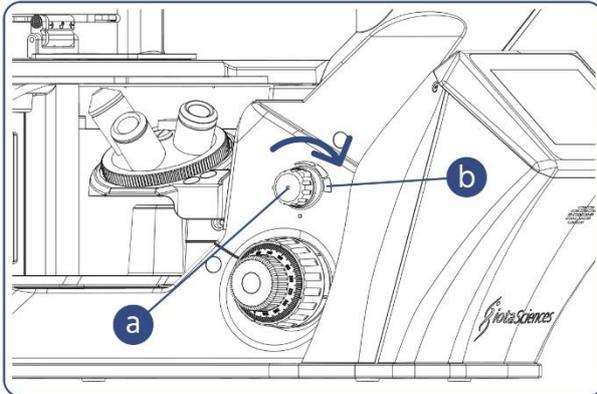
Rotating either knob in the front direction (arrow direction) raises the objective and rotating it in the opposite direction lowers the

objective.



When focusing, be careful not to crash the objective with the specimen.

7.6 Adjusting the brightness



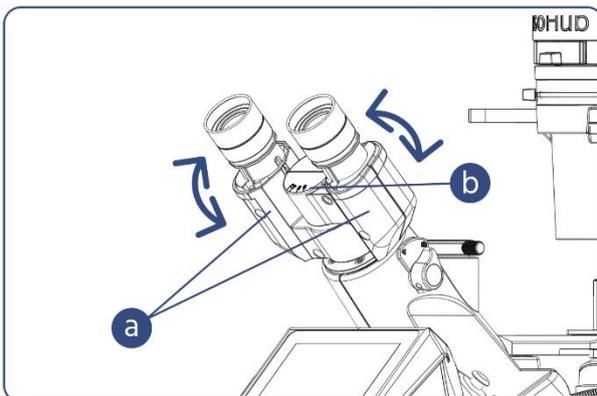
Rotate the brightness adjustment knob **[a]** to adjust the brightness.

Rotating the brightness adjustment knob in the front direction (arrow direction) makes the brightness brighter and rotating it in the opposite direction makes it darker.

8 Advanced observation

8.1 Adjusting binocular position

8.1.1 Adjusting the interpupillary distance



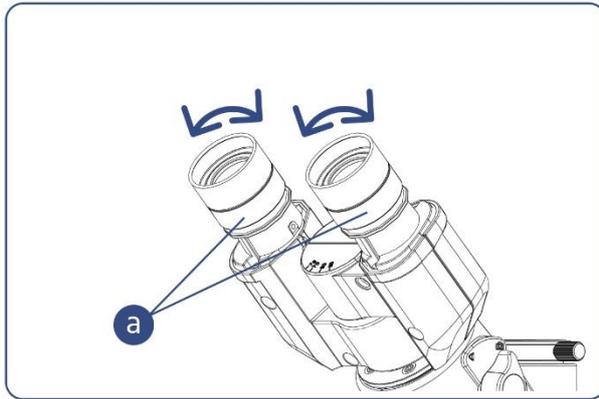
While looking through the eyepieces, move the binocular portion **[a]** until the left and right fields of view coincide completely.

The number shown by the indicator (protrusion **[b]**) of the left side (or right side) eyepiece sleeve is the interpupillary distance.



- Note your interpupillary distance so that it can be easily adjusted next time.
- You can adjust your interpupillary distance by moving the binocular portion either to upper or lower side. Select the upper side or the lower side according to your observation posture.

8.1.2 Adjusting the diopter



This operation corrects the difference between the left and right visions of the observer.

1. Set the scales of diopter adjustment rings **[a]** of right and left sides to "0".

2. Engage a low magnification objective (e.g. 10X) in the light path and rotate coarse/fine focusing knobs to bring the specimen into

focus.

3. Change to the high magnification objective (e.g. 20X) and rotate coarse/ fine focusing knobs to bring the specimen into focus.

4. Change to the low magnification objective (e.g. 10X). While looking into the right eyepiece with your right eye, rotate the right diopter adjustment ring **[a]** to bring the specimen into focus. In the same manner, while looking into the left eyepiece with your left eye, rotate the left diopter adjustment ring **[b]** to bring the specimen into focus.

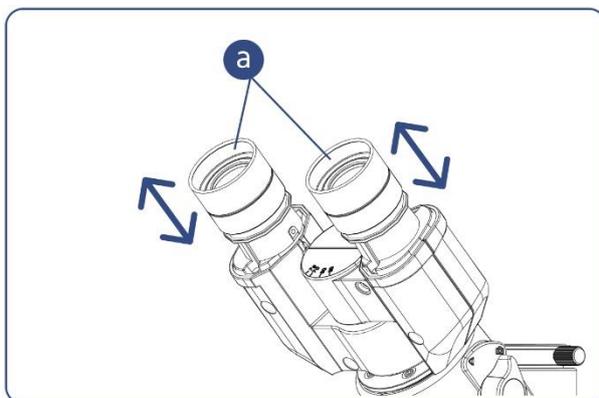
In this case, do not touch the coarse/fine focusing knobs.

5. Change to the high magnification objective (e.g. 20X) and rotate coarse/ fine focusing knobs to bring the specimen into focus.

6. Change to the low magnification objective (e.g. 10X) and confirm that the specimen is brought into focus with the right and left eyepieces.

7. If the specimen is not brought into focus, repeat steps from [4] to [6] to adjust again.

8.1.3 Using the eye shades



When wearing eyeglasses:

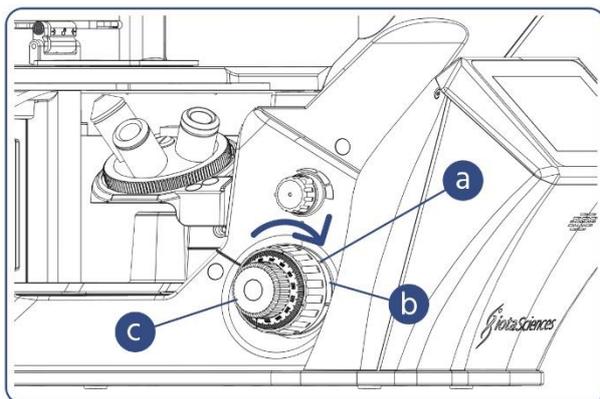
Use the eye shades in the normal, folded-down position.

When not wearing eyeglasses:

Extend the folded eye shades in the arrow direction. The observation becomes comfortable since it prevents unnecessary

light from entering between the eyepieces and eyes.

8.2 Adjusting tension of coarse focusing knob



The tension of the coarse focusing knob can be adjusted. Insert the tip of a large flat-blade screwdriver into the groove [a] on the tension adjustment ring [b] and rotate the ring. Rotating the coarse focusing knob in the arrow direction shown in the picture increases the tension and rotating it in the opposite direction decreases the tension respectively.



Never apply excessive force for rotating the tension adjustment ring [a] in the arrow direction shown in the picture. The ring may be damaged.

If the revolving nosepiece descends by its own weight or the focus obtained with the fine focusing knob [c] is lost soon, the tension is set too loose. In this case, turn the tension adjustment ring [b] in the arrow direction to increase the tension of the coarse focusing knob.

9 Recording with the camera

The observed image can be acquired by attaching the camera adapter and the camera to the camera port of the isoHub.

9.1 Changing between the visual light path and the camera light path

See section [7.4](#).

9.2 Focusing on the specimen

See section [7.5](#).

If the focusing of the image through the camera does not match with that of the image observed through the eyepieces, perform the parfocality adjustment. For the parfocality adjustment method, refer to the instruction manual for the camera adapter in use.

9.3 Acquiring the image

For the image acquisition method, refer to the instruction manual for the camera in use.

The image acquisition area is determined by the size of the image sensor used in the camera and the magnification of the camera adapter.

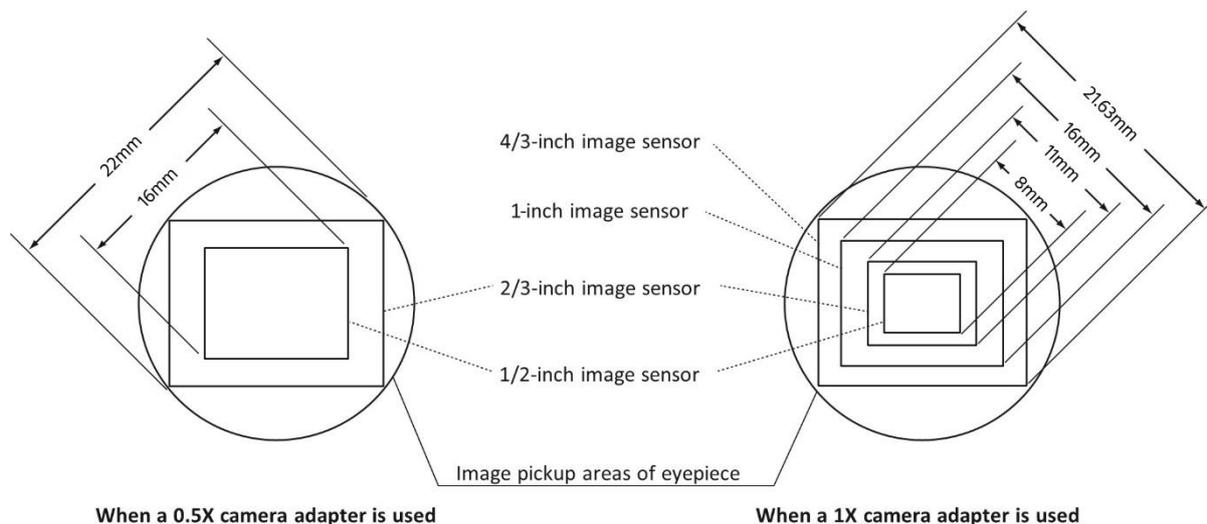


Figure 8: The image acquisition areas of camera adapters compared with observation area by the eyepieces (field number 22).

10 Maintenance

10.1 Cleaning

Users are recommended to clean the exterior of the isoHub regularly, ideally before and after each use. IotaSciences recommend the use of a paper towel dampened with 70% ethanol to gently wipe the outside of the isoHub.

Use the provided dust cover when isoHub is not in use to prevent dust from accumulating on the isoHub.

| | |
|---|--|
|  | <p>Care should be taken to ensure that excessive volumes of cleaning fluid are not used on the isoHub, as excess fluid entering the isoHub may lead to degraded performance or electrical safety risk.</p> |
|---|--|

11 Troubleshooting

| Problem | Cause | Remedy |
|----------------------------|---|---|
| The field of view is dark. | isoHub is not switched on or is asleep. | Turn on the isoHub (see section 4.1), or if asleep, touch the touchscreen or use the controller to wake the isoHub up (see section 4.11). |

| | | |
|--|---|---|
| | The light intensity is set to the minimum, or not adjusted correctly. | Rotate the brightness adjustment knob to adjust the brightness (see section 7.6). |
| | The phase contrast slider isn't inserted properly. | Adjust the phase contrast slider to use either the empty hole for bright field observation, or the pre-centred phase contrast slider for phase contrast observation (see section 7.1). |
| | The aperture iris diaphragm is closed or narrowed down too much. | Open the aperture iris diaphragm (see section 7.2). |
| | The dish holder or well plate holder is blocking the light path. | Move the dish holder or well plate holder out of the way of the light path (see section 4.2). |
| | The objective is not correctly engaged in the light path. | Engage the objective in the light path correctly (see section 9). |
| | The light path is set to the camera when trying to view through the eyepieces, or vice versa. | Switch the light path to the visual or camera light path (see section 7.4). |
| | The umbra shield is down. | Move the umbra shield up out of the light path. |
| | <i>(Fluorescence observation)</i> The filter cube is not properly engaged in the light path. | Engage the filter cube in the light path correctly. |
| | <i>(Fluorescence observation)</i> The shutter for reflected light illumination or the attenuator filter is engaged in the light path. | Engage the empty hole of the filter slider for reflected light illumination in the light path. |
| | <i>(Fluorescence observation)</i> The filter cube in use in the filter cube slider does not match the specimen. | Use the filter cube in the filter cube slider that matches the specimen. |

| | | |
|---|---|--|
| | <i>(Fluorescence observation)</i> The specimen under observation does not fluoresce. | Use a known sample to check the isoHub fluorescence setup. |
| The image is poor, or the contrast of the image is low, or the resolution of the image is poor, or the image blurs. | The container is fogged. | Eliminate the fog. |
| | The objective is dirty. | Clean the objective. |
| | The phase contrast slider is not correctly engaged in the light path. | Match the phase contrast slider correctly with the light path position (see section 7.1). |
| | <i>(Fluorescence observation)</i> The umbra shield (ambient light shielding plate) is not engaged in the light path. | Engage the umbra shield in the light path. |
| A part of the field of view is not visible or is dark. Or, the brightness of the field of view is not even. | The phase contrast slider is not correctly engaged in the light path. | Match the phase contrast slider correctly with the light path position (see section 7.1). |
| | The objective is not correctly engaged in the light path. | Engage the objective in the light path correctly (see section 9). |
| | The dish holder or well plate holder is blocking the light path. | Move the dish holder or well plate holder out of the way of the light path (see section 4.2). |
| | <i>(Fluorescence observation)</i> The filter cube is not properly engaged in the light path. | Engage the filter cube in the light path correctly. |
| | <i>(Fluorescence observation)</i> The direction of the filter slider for reflected light illumination which is inserted to the fluorescence illuminator is not correct. | Set the direction of the filter slider for reflected light illumination correctly. |
| | <i>(Fluorescence observation)</i> The centring of the CoolLED light source is not performed. | Adjust the centring of the CoolLED pe4000. |
| | <i>(Fluorescence observation)</i> The objective is not correctly engaged in the light path. | Engage the objective in the light path correctly. |

| | | |
|---|--|---|
| Dust or dirt is visible in the field of view. | Dust or dirt is left on the eyepieces. | Clean the eyepieces. |
| | Dust or dirt is left on the optical element. | Clean the optical element. |
| | Dust or dirt is left on the specimen. | Clean the specimen, or replace it with a clean specimen. |
| One side of the field of view blurs. | The specimen is tilted on the stage. | Set the specimen correctly on the stage. Ensure the 60mm dish holder or well plate holder are attached properly (see section 3.2.7). |
| | The stage centre plate or heated centre plate is not placed at the correct position or it is tilted. | Attach the stage centre plate or heated centre plate at the correct position. |
| Fields of view of two eyes do not coincide. | The interpupillary distance is not adjusted correctly. | Adjust the interpupillary distance correctly (see section 8.1.1). |
| | The difference in diopter of two eyes is not compensated. | Adjust the diopter correctly (see section 8.1.2). |
| The objective interferes with the stage centre plate. | The stage centre plate or heated centre plate is not placed at the correct position or it is tilted. | Attach the stage centre plate or heated centre plate at the correct position. |
| The focus changes during observation without user interaction. | The tension of the coarse focusing knob is not adjusted appropriately. | Adjust the tension of the coarse focusing knob to be heavier (see section 8.2). |
| The rotation of the coarse focusing knob is too heavy. | The tension of the coarse focusing knob is not adjusted appropriately. | Adjust the tension of the coarse focusing knob to be lighter (see section 8.2). |
| The dish data on isoHub doesn't match the dish data on the isoCell. | The isoCell and isoHub haven't synced data recently. | Ensure the isoHub is switched on, then on the isoCell, go to run the Data program (see section 6.1). |
| | The isoCell and isoHub are no longer linked. | Setup data syncing (see section 6.4.1). |
| Unable to access dish data on the isoHub. | Dish data is in use on the isoCell. | Ensure the isoHub is switched on, then on the isoCell, go to run the Data program (see section 6.1). |

Should your problem still be unresolved, please contact iotaSciences technical support by raising a support ticket via the [iotaSciences customer portal](#).

12 Disposal of isoHub

12.1 EU Waste Electrical and Electronic Equipment (WEEE) Directive

| | |
|---|---|
|  | <p>In August of 2005, the European Union (EU) implemented the EU WEEE Directive 2002/96/EC and later the WEEE Recast Directive 2012/19/EU requiring Producers of electronic and electrical equipment (EEE) to manage and finance the collection, reuse, recycling and to appropriately treat WEEE that the Producer places on the EU market after August 13, 2005. The goal of this directive is to minimize the volume of electrical and electronic waste disposal and to encourage re-use and recycling at the end of life.</p> |
|---|---|

Iota Sciences Ltd has met its national obligations to the EU WEEE Directive by registering in those countries to which Iota Sciences Ltd is an importer. Products bearing the symbol of a strikethrough refuse bin must not be disposed of along with unsorted refuse.

To dispose of your isoHub at the end of its useful life, please contact IotaSciences for the correct procedure.

12.2 Users outside the European Union

To dispose of your isoHub at the end of its useful life, please refer to your local waste management organisation for proper disposal practices for used electronic and electrical equipment.

13 Technical support

For technical questions, support issues or sales, contact IotaSciences via the contacts below:

Iota Sciences Ltd
Begbroke Science Park
Begbroke Hill
Woodstock Road
Yarnton
Oxfordshire
OX5 1PF
UK

Support Email: techsupport@iotasciences.com

Sales Email: sales@iotasciences.com

Website: <https://www.iotasciences.com>

Customer portal: <https://www.iotasciences.com/login-only/>

Please have the serial number of your isoHub available when contacting Technical Support.

14 Additional information

14.1 Limited warranty

Iota Sciences Ltd sells the isoHub with a one-year warranty from the date of delivery against defects in design, materials and workmanship. If this product is found to be defective within that time, Iota Sciences Ltd may, in its sole discretion, at no additional or delivery cost, either repair or replace the unit, provide replacement parts, or issue a full refund and rescind the contract. This warranty does not cover accidental damage, wear and tear.

Please refer to our full terms and conditions (as applicable at the time of purchase) for more information on the exact scope of the above warranty. In case of any discrepancy between the above warranty and said full terms and conditions, said full terms and conditions will take precedence.

To make a warranty claim, please contact Iota Sciences Ltd at techsupport@iotasciences.com before returning your instrument to us.

14.2 Limited liability

To the maximum extent permitted by law, unless otherwise stated in our terms and conditions:

- Iota Sciences Ltd expressly excludes any liability, whether in contract, tort (including negligence), for breach of statutory duty, or otherwise, arising under or in connection with the purchase of this instrument for loss of profits, loss of business, loss of revenue, loss of agreements, loss of contracts, loss of good will, loss of use or corruption of software, data or information or any indirect or consequential loss.
- The company's maximum aggregate liability arising out of or in connection with the agreement, or any product or service, shall be limited to the amount paid by the buyer to the company for the product or service purchased.

Please refer to our full terms and conditions (as applicable at the time of purchase) for more information regarding the above.

Please also note that any scientific information/protocols contained herein is believed to be correct and corresponds to the latest state of scientific and technical knowledge. However, no warranty is made, either expressed or implied, regarding its accuracy or the results to be obtained

from the use of such information. Any user must make their own determination and satisfy themselves that the information and recommendations given by Iota Sciences Ltd or its affiliates are (i) suitable for intended process or purpose, (ii) in compliance with environmental, health and safety regulations, and (iii) will not infringe any third party's intellectual property rights.

14.3 Medical use restrictions

The isoHub is intended for research use by professionals only. The isoHub is not intended to be used for diagnostic purposes, or for testing or treatment in humans.

14.4 Registered office

Iota Sciences Ltd
Begbroke Science Park
Begbroke Hill
Woodstock Road
Yarnton
Oxfordshire
OX5 1PF
UK

14.5 Legal information

The Company reserves the right to update user manuals at any time without notice and the recipient is strongly encouraged to regularly check for updates on the [iotaSciences customer portal](#).

The isoHub is manufactured by Iota Sciences Ltd, Begbroke Science Park, Begbroke Hill, Woodstock Road, Yarnton, Oxfordshire, OX5 1PF, UK.

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