



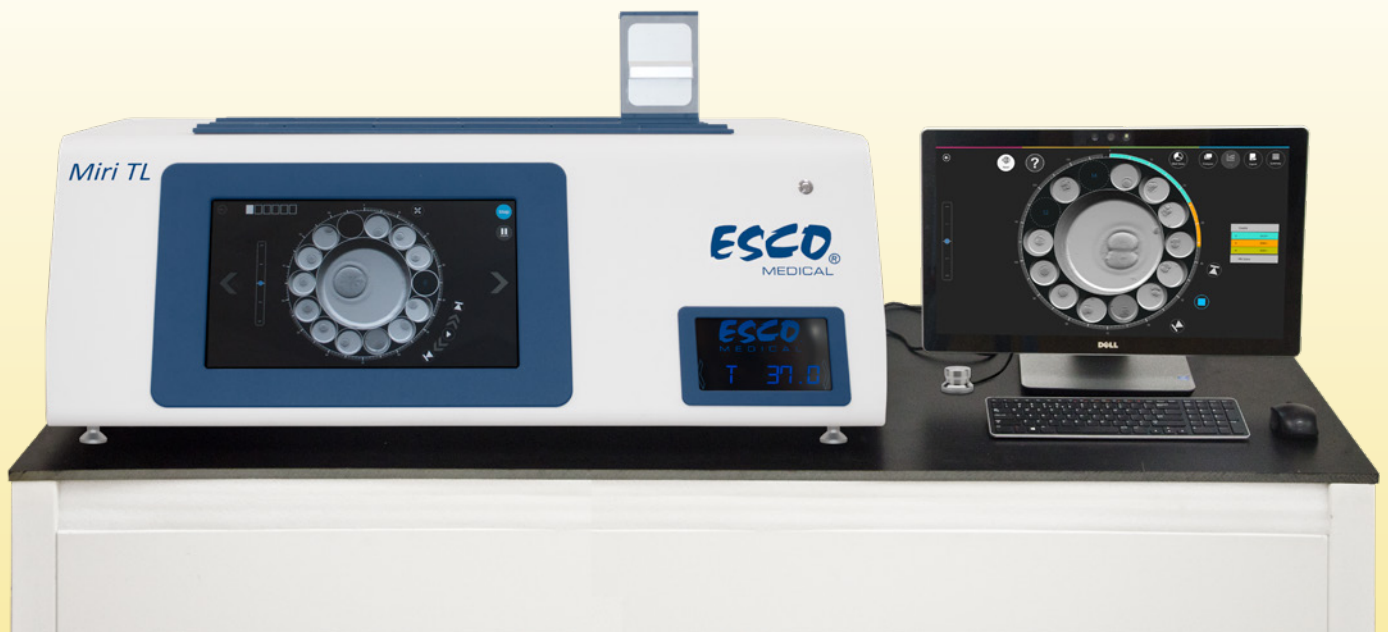
The Next Generation of Time-Lapse Systems.

# Miri<sup>®</sup> TL12

Time-Lapse Incubator for IVF

## Design Excellence - Superior Quality

All the features you love about  
the Miri<sup>®</sup> Time-Lapse Incubator,  
with double the capacity.



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# Miri® TL12

“A state of the art time-lapse incubation system for IVF”

While still maintaining all of the impressive features of its successful predecessor the Miri® TL6, the new Miri® TL12 now comes equipped with 12 separate chambers that have been meticulously designed to prevent cross-contamination during the delicate process of embryo incubation.

The Independent temperature regulation also still ensures optimal embryo development in every compact chamber.

This significantly reduces the disturbance of embryos within every delicate stage of development, and minimizes the stressful factors that are introduced with more traditional methods involving removing dishes from incubators for periodic observation. These enhanced features culminate to provide a unique embryo incubation environment with the market's most secure and gentle handling procedures.



*Miri® TL12 — Never miss a significant event in embryo development with the continuous monitoring system.*



## CultureCoin, a culture dish, exclusively designed for the Miri® TL

## FEATURES:

### Twelve (12) chambers

- The Miri® TL12 has twelve (12) individual chambers which allow embryologists to culture embryos in such a way that there is one independent chamber for each patient.
- The small chamber design allows for excellent recovery rates:

**Gas recovery:** less than three (3) minutes  
**Temperature recovery:** less than one (1) minute

### Heated Lid

- Prevents condensation.
- Enhances temperature regulation/recovery.
- Excellent uniformity of heat distribution between the top and bottom lid.

### Direct Heat Transfer

- Provides superior temperature stability.
- Less than one (1) minute of temperature recovery.

#### 2 Temperature Mode Options:

- **Single:** Uniform set points for all 12 (twelve) chambers.
- **Multi:** Individual set points for each chamber.

### Time-Lapse Monitoring

- As images are digitally stored, a video can be generated to enable a more objective and precise grading of the embryo.
- The Time-Lapse video enables a detailed scoring of embryos cultured for better prediction of future developmental and implantation potential.

### Touch Screen Control Panel

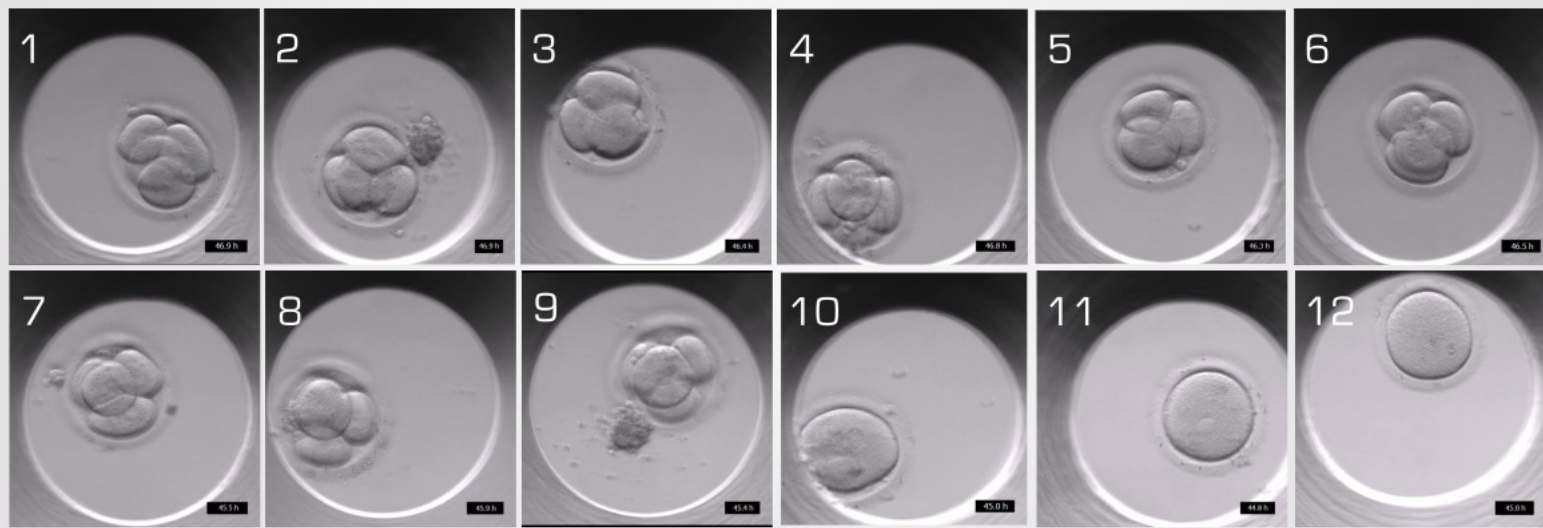
Easily change parameter settings with a reliable touch-screen display. Configuration is as simple as you need it to be.



One (1) Miri® TL12 chamber can hold one (1) CultureCoin. Each dish can accommodate up to fourteen (14) embryos. With Twelve (12) chambers in a Miri® TL12, the total capacity is 168 embryos.

### Key Features

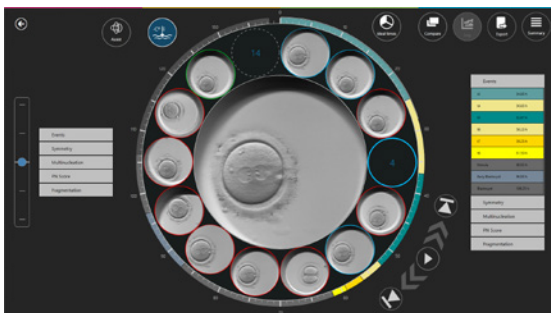
- Holds up to 14 embryos with individual numbered wells (1-14)
- 1 CultureCoin per patient is allowed. Each CultureCoin contains 14 wells. Each well contains 1 embryo. So there will be no patient mix up in one coin, and no media mix up per well.
- Ergonomic design for easy and safe handling while allowing for a secure location of embryos
- Independent well for pH measurements.
- Oxygen plasma treated for the effective prevention of bubble formation.
- Gamma-sterilized.
- Each dish is packed in an individually sealed pouch (25 pieces/box)



# Watch them Grow

Using a built-in camera and a microscope, the Miri® TL can continuously capture time-lapse images of your embryo as it develops. This empowers users with more information to make better embryo-related decisions.

## More Data For Observations, Better Selection



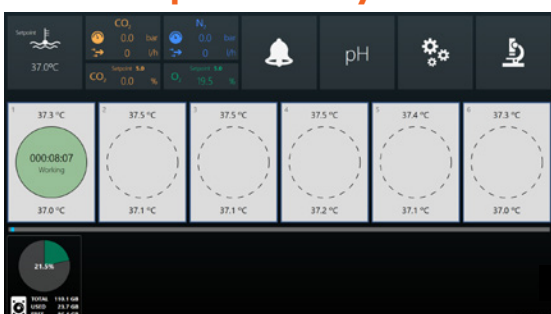
- By using the embryo evaluation tools on the Viewer station, only the best embryos are selected and therefore unviable embryos are eliminated.
- Retrospective data analysis provides complete documentation of patient details, treatment and embryo data. This can also be used for reference, knowledge sharing and training for embryologists.

## Don't miss out on crucial events

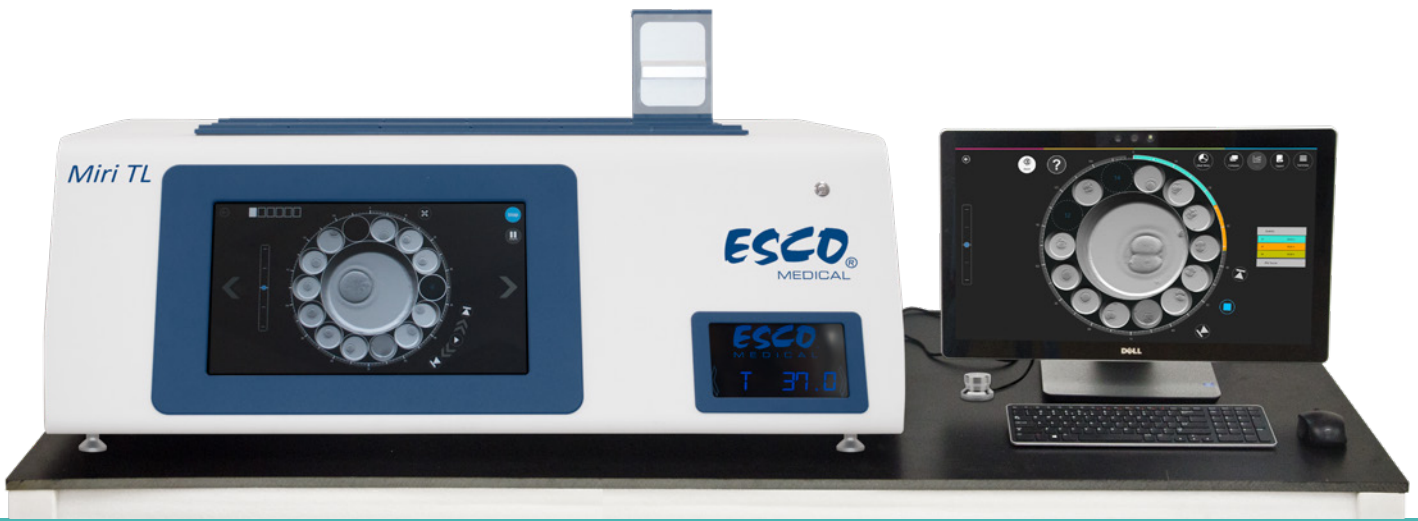


- Time-Lapse provides continuous surveillance of all embryos.
- No more missing important events:
  - actual timing of cleavages compared to ideal time
  - actual timing of morula and blastocyst stages
  - detect unusual cleavage patterns such as Direct Cleavage and Reverse Cleavage
  - synchrony of divisions
  - multinucleation
- The time-lapse session runs up to 199 hours.

## Time-Lapse Embryo Recording and Monitoring

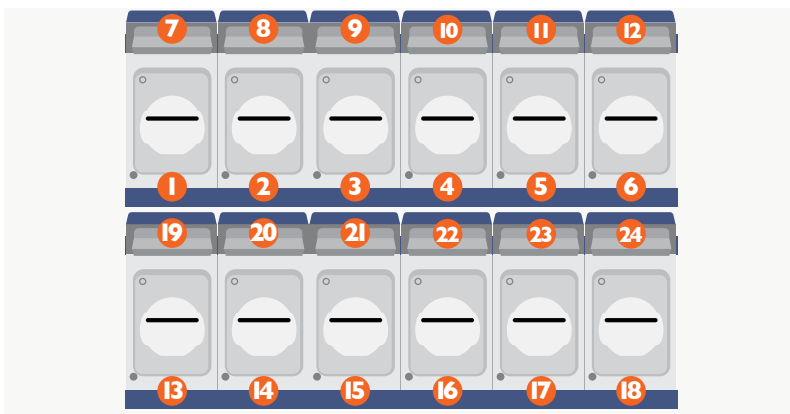


The main screen shows all twelve (12) chambers as each counter illustrates the duration of time-lapse recording done. At the upper right portion, snapshots of other useful information regarding the incubator such as temperature, pH measurement, CO<sub>2</sub> and O<sub>2</sub> status, and Set Points (SP) are displayed.



# Superior Incubation Environment

In Miri® TL12, twelve (12) separate chambers are designed to prevent cross-contamination during the incubation process. The independent temperature regulation ensures optimal embryo developmental conditions. This significantly reduces disturbance and minimizes stressful factors that may be introduced when taking the dishes out of the incubator. This value-added treatment provides a unique incubation environment with the market's most secure and safe handling procedures.



- A total of 24 completely independent sensors ensure constant temperature stability.
- Rapid temperature and gas recovery to ensure optimal environment stability.
- Pre-mixed gas is no longer a requirement but an option and total gas consumption is very low.

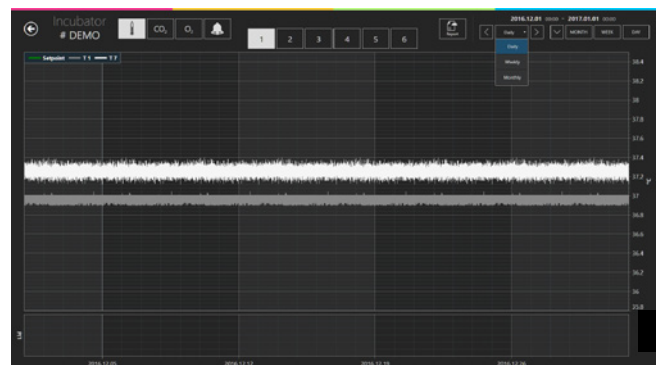
## Data And Alarms Logging

The Miri® TL12 data logger continuously documents all incubation parameters such as flow, pressure, and concentration of CO<sub>2</sub>, O<sub>2</sub> and temperature regulation data. Details of any alarm events such as out-of-range parameters are also stored for retrieval.

You can also view similar performance data right on your Miri® TL12 Viewer Software on a daily, weekly or monthly basis for all twelve (12) chambers. Data can also be easily printed for record keeping/audits.



The data-logger stores continuous performance data of the machine throughout its use. These can be viewed in graphs.



Conditions that put the Miri® TL12 into alarm state are recorded. It is possible for the software to send email alerts as well.

# High Quality Environment for Optimum Embryo Growth



## Advanced CO<sub>2</sub> + O<sub>2</sub> Regulation

### Provide total control of the gas phase environment

The built-in gas mixer and the high-performance CO<sub>2</sub> and O<sub>2</sub> sensors allow accurate control of gas phase composition in the chambers.

**Gas Recovery:**  
< 3 minutes

**Gas Consumption:**  
CO<sub>2</sub>: < 2 L/h  
N<sub>2</sub>: < 10 L/h

## High Quality Recirculated Airstream

### High Quality Airstream Via:

Volatile Organic Compounds or VOCs are toxic to an embryo. It directly attaches to the DNA and can pose detrimental effects on its development. The Miri<sup>®</sup> TL12 is specially equipped with HEPA+VOC filter to help eliminate harmful VOCs and particulates.

HEPA+VOC filter  
254 nm UV-C with 185 nm filter



## Easy Parameter Validation

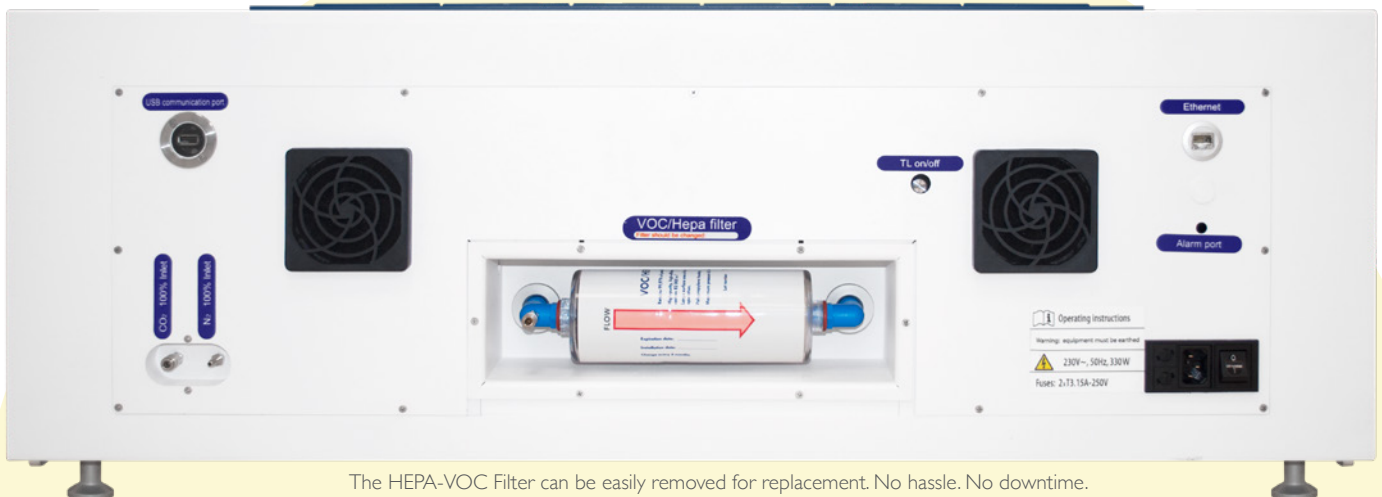
### Quality Checking an easy breeze!

Each compartment has an individual PT1000 sensor and gas sample port specifically designed for independent and continuous validation of temperature and gas concentration. Can be connected to a Miri<sup>®</sup> GA, a Gas and Temperature Validation unit, for continuous external validation of both gas and temperature.

It also has a pH measuring system and a small validation well on the CultureCoin for easy checking of the pH in each compartment.



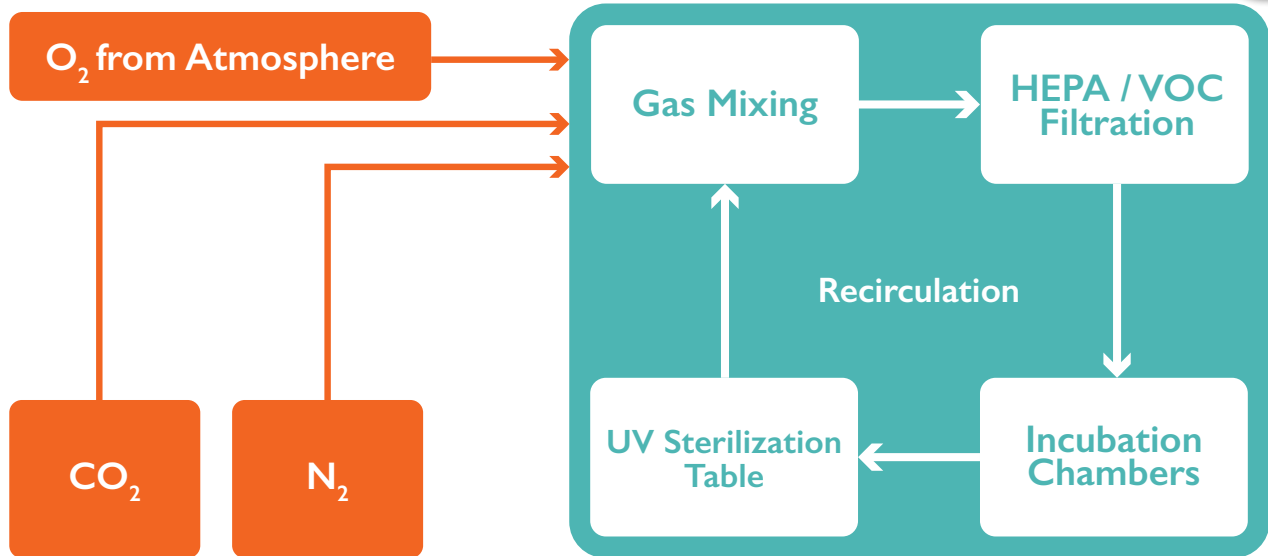
MRI-GA



The HEPA-VOC Filter can be easily removed for replacement. No hassle. No downtime.



# Airflow Diagram



## Input Gases and Mixing

The Miri®TLI2 is a tri-gas system, which requires 100% CO<sub>2</sub>, 100% N<sub>2</sub> and atmospheric Oxygen. The gases go through the built-in gas mixer, which regulates the concentration of the CO<sub>2</sub> and O<sub>2</sub> in the culture chambers to the desired level. The gas levels are regulated according to the feedback loop from a NDIR CO<sub>2</sub> sensor and a medical grade chemical O<sub>2</sub> sensor. Nitrogen is infused to suppress the ambient O<sub>2</sub> level. The Miri®TLI2 incubator can also work on pre-mixed gases.



## HEPA-VOC Filtration

The gases then go through the HEPA-VOC filter that effectively removes Volatile Organic Compounds (VOCs) and particulates larger than 0.3 µm.



## Incubation Chambers and Gas Recirculation

Afterwards, gases go through the twelve (12) chambers. The incubator features a re-circulated gas system, whereby each of the twelve (12) chambers is constantly monitored for gas concentration and adjusted to the correct level. Gas is drawn from all the compartments and routed through a gas mixing box where the gas concentrations are adjusted.



## UV Sterilization

Then the gas is subjected to a 254 nm UV-light exposure after passing through the mixer. The UV-C light has filters that inhibit any 185 nm radiation that would produce dangerous ozone. The VOC filter is located after the UV-C light, put through a HEPA and Carbon/VOC filtering before the gas is dispensed back into the twelve chambers. UV-C is user set and can be switched off.

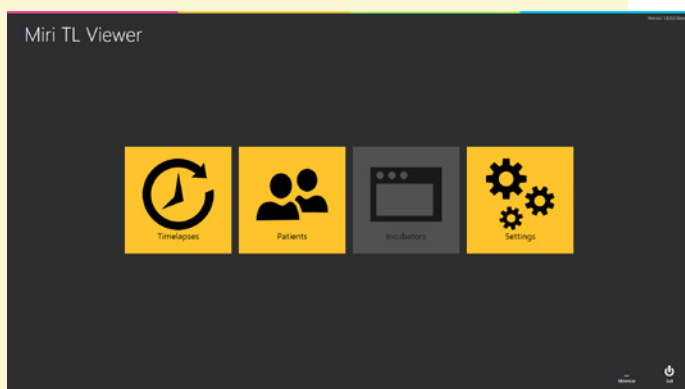


# Embryo Analysis and Evaluation System



## Simple and Intuitive

The Miri® TL12 Viewer Software is a simple yet sophisticated information-providing tool that can help embryologists process the data generated. You can review, annotate and compare the morphokinetic parameters for the selection of the best embryo for transferring, vitrification, and deselection. Data can also be exported for retrospective analysis.



## Complete Data Logging System

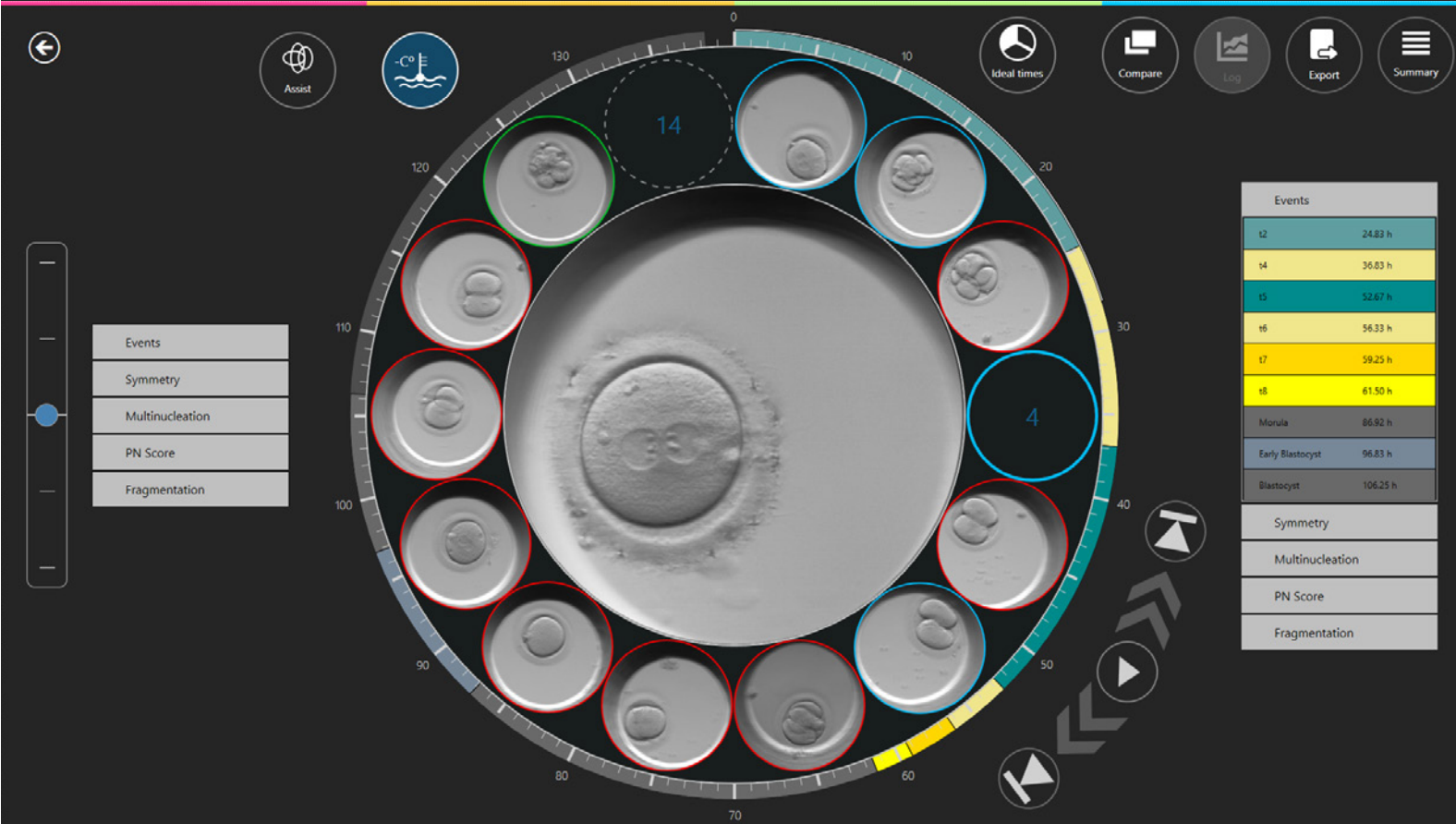
The main view shows four buttons:

- ▶ Timelapses (a list of pending, ongoing and past time-lapse sessions)
- ▶ Patients (Patient database)
- ▶ Incubators (view connected Miri® TL12 incubator)
- ▶ Settings (customize any annotation and ideal timing parameters)



## Embryo Development Overview

Viewing the embryo development has never been this better. The *Revolver View* shows all embryos incubated within a CultureCoin. This view is your jumping point for doing the annotation and selection. From here, you can select an embryo to annotate and to compare its development with other embryos to select the most viable one.



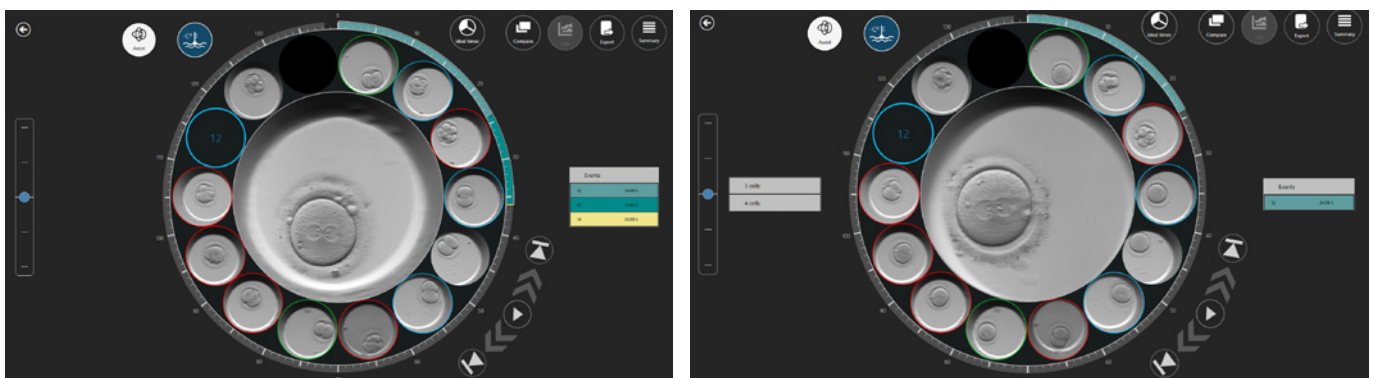
## Sophisticated Tools for Annotation

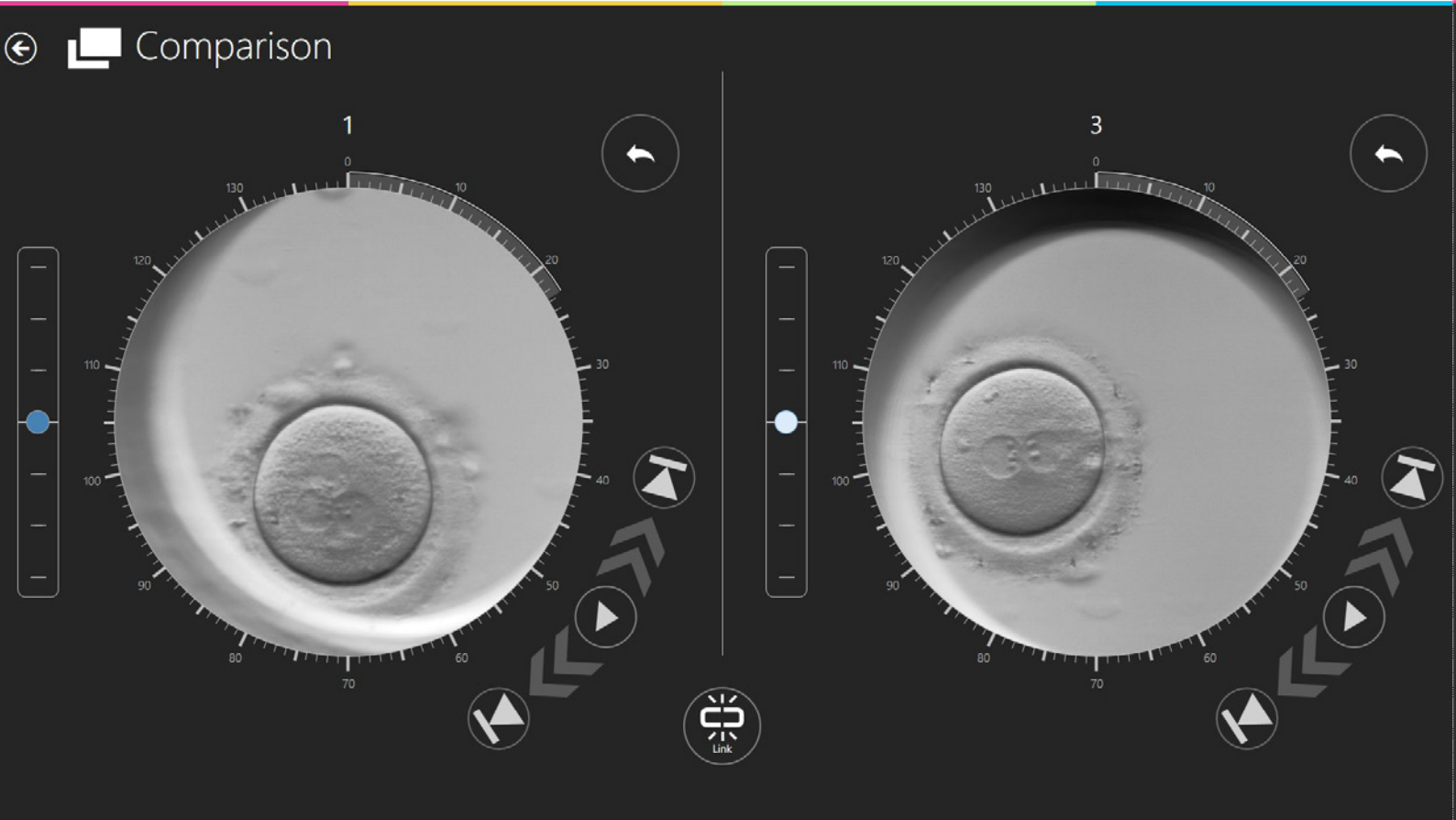
Embryo annotation is made easy! The annotation system is structured around the “events” that are located on the left of the wheel. Annotation is the process of time-marking a specific event/ parameter e.g. if you’ve observed t2 to happen at 27 hpi, you can click “t2” on the list of events from the left column and the annotated parameter of t2 at 27 hpi will be displayed in the right column. By default, the events list has t2, t3, t4, t5, t6, t7, t8, morula, blastocyst and early blastocyst.

The benefit of the software gives the user the ability to customize each event completely. The events listed in the left column can be customized to include other parameters not included in the default settings. You can go to Settings where you can find more advanced parameters that can be included in your time-lapse grading system. To complement these features, we have added the Ideal Time function, by way of a circular coloured band on the outside of the annotated events, indicates their ideal timings, making it easier to compare between the actual timing of the embryo development to the ideal time.

## Assisted Annotation

Miri<sup>®</sup> TL12 Viewer also has an “**Assist Button**” tool that automatically detects cleavage events. This helps embryologists with the accurate detection of the first cleavage. The Assist function does an automatic detection of cleavages up to the 4 cell-stage event.





## Side-by-Side Comparison

Choosing the most viable embryo for transfer is made easier with the **Compare Tool**. It allows you to make a side-by-side comparison of the embryo development. It offers you the flexibility to choose the particular time point you would like to compare.

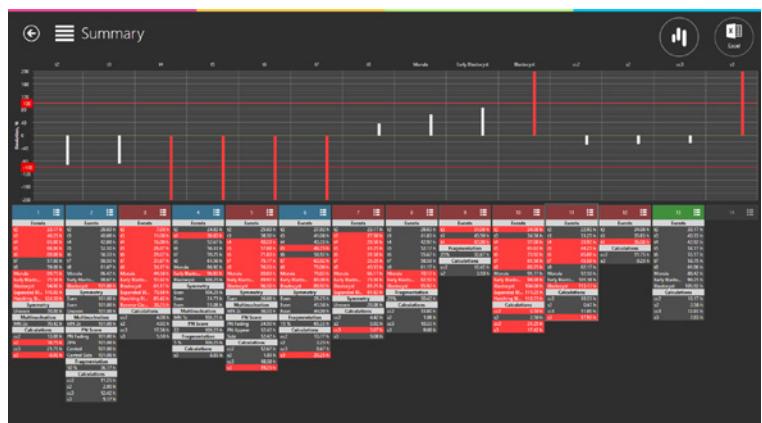
## Easy to Understand Summary View

The **Summary View** is a helpful tool in comparing and selecting the most viable embryo based on the annotations you've made. The Horizontal View allows you to compare the actual cleavage timings of all embryos against the ideal timing.

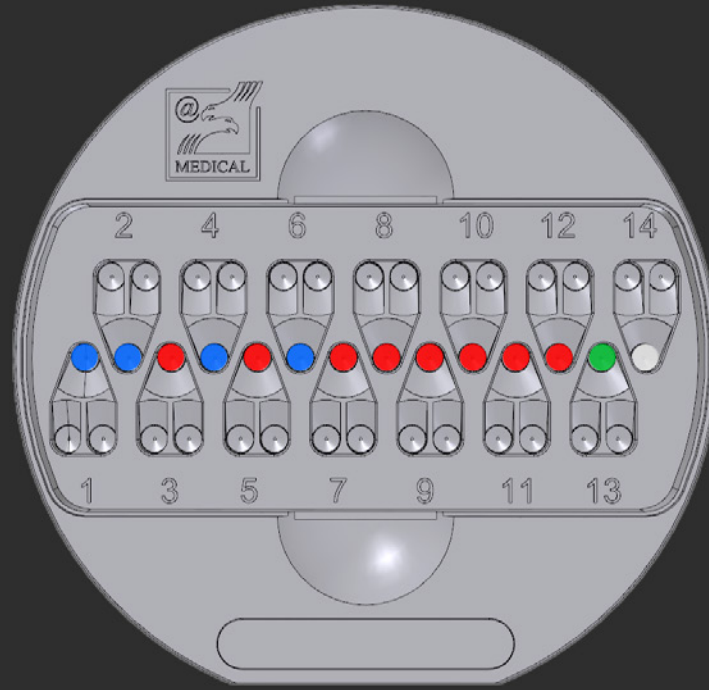


Horizontal View

The Vertical View provides information if the cleavage timing is within the acceptable criteria (range) or not. The white vertical bar indicates that the cleavage timing is within the acceptable range while the red bar indicates otherwise.



Vertical View



Once the evaluation and comparison has been completed, the embryos can be assigned with colours that indicate the decision:

A coloured ring will appear around the embryo well and the colour on the dish map will also change accordingly.

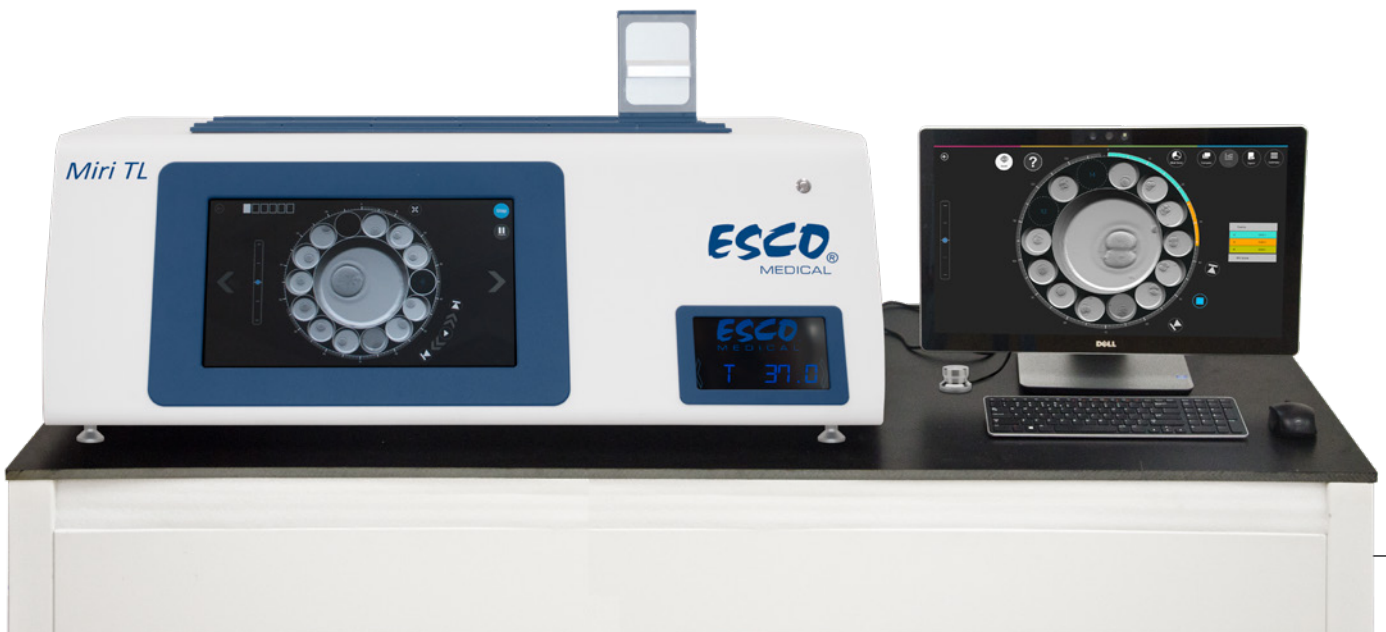
	White - No Decision		Blue - Freeze
	Green - Transfer		Red - Discard

## Freedom to Personalize

**Our belief is that as the purchaser of device, the device belongs to you.** Therefore, it should offer you the freedom to customize and adjust the instrument and parameter settings completely. Therefore, the "Ideal Time" function and Events for the annotation can be optimized based on the requirements of your clinic.

The Time-Lapse incubator stays true to Esco's world class expertise and quality in IVF technology.

Make Miri® TL12 a part of your IVF lab.



# Don't Measure pH, Monitor with SAFE Sens



## SAFE Sens\* Integration

The integration of SAFE Sens technology to the Esco Miri® TL Time-Lapse incubator creates the most advanced non-invasive embryo monitoring system in the market. No other systems can have as much information at your fingertips about your embryo development and embryo culture in real-time.



### Continuous pH measurement

- Reading and recording every 30 minutes (default setting - adjustable).
- Single use sensor probe for up to seven (7) days of pH readings.



### Easy to implement

- Easy to align (no buffers, no hassles).
- Easy to use and maintain.



### Data-Logging System

- Data Logging and user alarms.
- Each TrakStation® can be connected to multiple incubators.



### Compact and Efficient

- No more unnecessary openings of your incubator for spot pH measurement.
- Only requires 100 µL of media + 150 µL of oil.

\* SAFE Sens is a trademark brand of Blood Cell Storage, Inc. (BCSI). SAFE Sens integration is currently offered as a factory-installed option.

## Accessories



Miri® TL



SV2 Sensor



QC2 Alignment Tool



SAFE Sens TrakStation

### Notes:

- (1) One QC2 alignment tool can be used on all incubators. If incubators are located in separate rooms, you may have to order more than one QC2 tool.
- (2) QC2 Alignment tool and SV2 sensors have an expiration date of one (1) year.
- (3) The Miri® TL I2 with SAFE Sens automatically comes with free one (1) pack of SV2 sensors, which is to be used for Site Standardization. Please determine how many additional packs you need for routine pH testing.
- (4) One TrakStation can connect up to eight (8) incubators by using a USB 3.0 Hub.

# General Specifications



## Miri® Time-Lapse Incubator

Overall Dimensions	960 × 700 × 325 mm
Temperature Control Range	25 - 40 °C
Gas Consumption (CO <sub>2</sub> ) *	< 2 L/h
Gas Consumption (N <sub>2</sub> ) **	< 10 L/h
CO <sub>2</sub> Control Range	1.9 - 10%
O <sub>2</sub> Control Range	5 - 20%
Input Gas Pressure	0.6 bar (8.7 psi)
Built-in Microscope	Zeiss objective with 20x magnification and numerical aperture of 0.35
Embryo Illumination	0.064s per image, using 1W single red LED (635nm)
Camera Resolution	1280 × 1024. Monochrome, 8-bit, IDS system.
Optics Tube Ratio	2.22 px/μm
Imaging Focal Planes	5 min. image interval in 3 to 7 focal planes

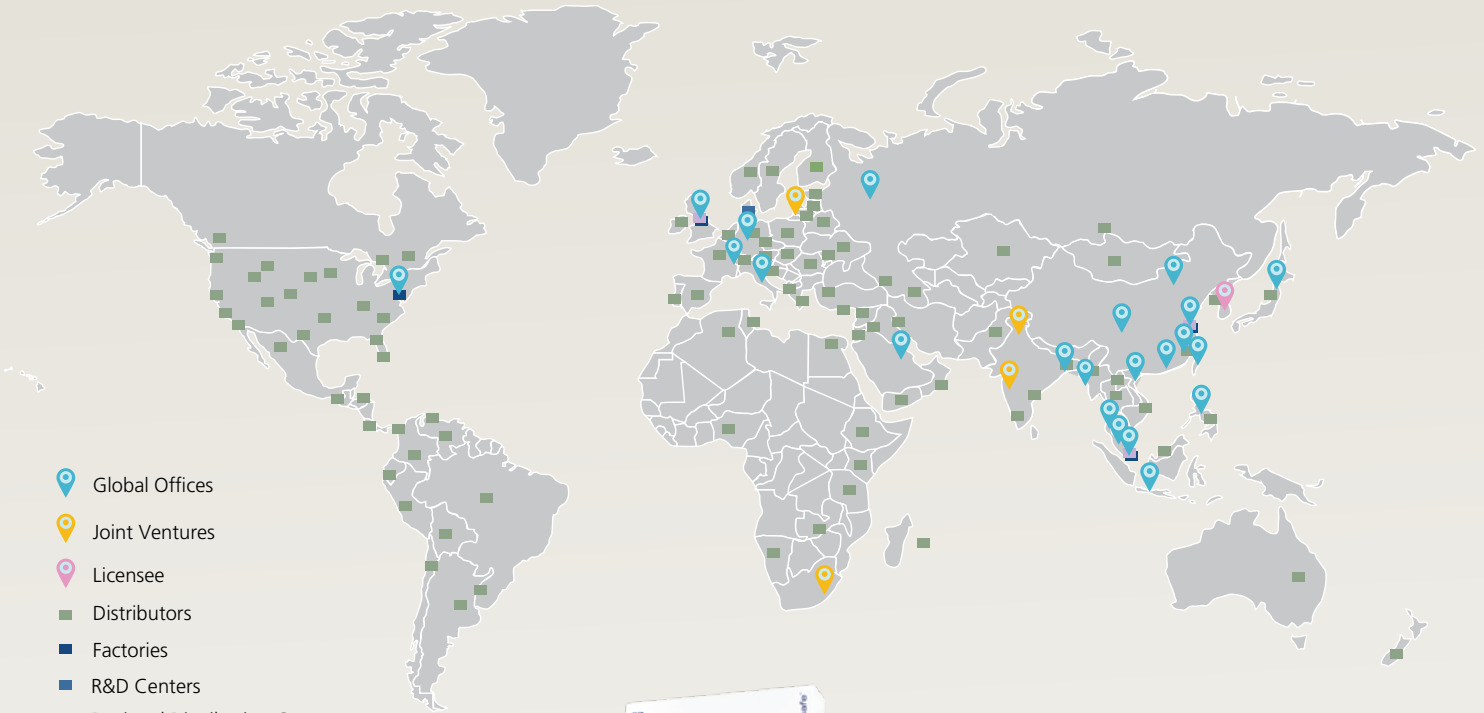
\* Under normal condition (CO<sub>2</sub> set point reached at 5.0%, all lids closed).

\*\* Under normal condition (O<sub>2</sub> set point reached at 5.0%, all lids closed).

## Ordering Information

ITEM CODE	MODEL CODE	DESCRIPTION
<b>Unit</b>		
2070100	MRI-TL12C-8	Miri® Time-Lapse Incubator; 12 Chambers, 230V, 50/60 Hz
2070101	MRI-TL12C-9	Miri® Time-Lapse Incubator; 12 Chambers, 115V, 50/60 Hz
<b>Accessories</b>		
1320011	MRA-1007	HEPA + VOC filter (to be replaced every 3 months)
1320088	MRI-CC	CultureCoin for Time-Lapse of 14 embryos (25 pcs. per pack)
1320045	MRI-GA	Miri® GA CO <sub>2</sub> /O <sub>2</sub> & Temperature Validation Unit, 115V/ 230V
TBA	TBA	Miri® Time-Lapse Incubator; 12 chambers with SAFE Sens, 230V, 60/60 Hz
TBA	TBA	Miri® Time-Lapse Incubator; 12 chambers with SAFE Sens, 115V, 60/60 Hz

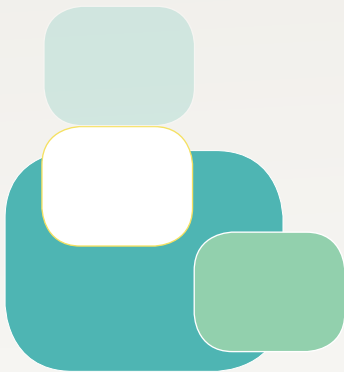
# GLOBAL NETWORK



- Global Offices
- Joint Ventures
- Licensee
- Distributors
- Factories
- R&D Centers
- Regional Distribution Centers



- Esco Medical Products:**
- Anti-Vibration Table (AVT)
  - CelCulture CO<sub>2</sub> Incubator
  - Culture and Fertilization Dishes
  - Fertilisafe® IVF Workstation
  - Miri® Benchtop Multi-room Incubators
  - Mini Miri® Humidified Benchtop Incubator
  - Miri® TL6 Time Lapse Embryo Incubator
  - Miri® GA (Gas and Temperature Validation Unit)
  - Miri® GA Mini (Gas Analyzer)
  - Semi Closed Environment (IVF/ICSI)



*Infertility is viewed as a problem that has social, psychological, and economic impacts to the afflicted individuals and couples. It is a global concern that knows no race or creed. It has been estimated that 1 in 6 couples would struggle with infertility at least once in their lifetime.*

*Esco Medical is one of the divisions of the Esco Group of Companies, the other two being the laboratory and pharmaceutical equipment divisions. Esco is now targeting innovative technological solutions for fertility clinics and laboratories. Esco Medical is positioned to become a leading manufacturer and innovator of high-quality equipment such as long-term embryo incubators, ART workstations, anti vibration table, time-lapse incubator and etc.*

*Esco Medical products are designed to develop with the Silent Embryo Hypothesis as a guiding principle. The Silent Embryo Hypothesis states that the less disturbed an embryo can remain, the better its developmental potential will be. Most of our products are designed in Denmark and made in the EU. The primary focus of this division is to increase pregnancy success rates and patient satisfaction.*



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