

Multitron 2

Flexible Incubator shaker system



Multitron 2

INFORS HT is an international team with branches in Europe and the USA.

Innovative thinking, quality and an understanding of the needs of our partners has secured INFORS HT an unrivalled place amongst manufacturers of bioreactor and shaker equipment. An enthusiasm for experiment and a creative mind has guided the company from its establishment in 1965 through its development into a medium-sized enterprise. Independence, a distinctive character and a strong team spirit will continue to serve us well in the future.

The head office on Infors AG is in Bottmingen



Quality standards

ISO 9001
CE
EMV

For process documentation cGMP

Documentation
IQ
OQ

Multitron 2

The Multitron 2 is the result of a 10 year development with our customers coupled with the construction and manufacturing experience of the INFORS HT team since 1965.

A clear concept

Laboratory space is both scarce and expensive. The Multitron 2 successfully combines flexibility, user-friendly operation and operational safety with the optimum utilization of space. Thanks to its modular construction and downwards-opening door, the Multitron 2 can either be a single unit for use on or under the laboratory bench, or operate as part of a stacked system. Of course, it is possible to expand the system at a later date to a two or three deck system.



What can you do with a Multitron 2 ?

For all applications, the optimum shaking motion and incubation conditions are required:

- Vigorous shaking for bacteria, yeast or fungi
- Gentle and smooth action for cell culture
- Appropriate for uses in molecular biology such as Mini & Maxi-preps or protein expression.

Precise temperature control, gassing*, humidification* and lighting*. *Options.

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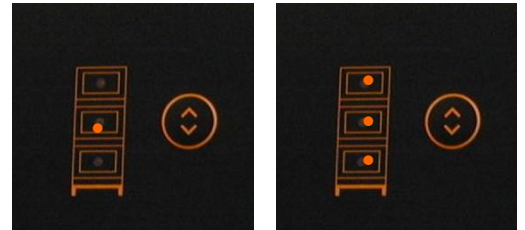
User-friendly



Entry of set points and timer functions are made using sensitive, reliable buttons shaped in the form of icons. Two large LED displays provide visual confirmation of control.

It is possible to control every deck from any of the others, using the dual arrow keys icon (left) on each machine, making for more comfortable operation. So it's possible, for example, to program the lower machine without bending down by using the middle unit. If all units are to operate under the same conditions, they need only be entered once from a single deck.

For electronic communication, an RS232 connection is standard



(Sophie - X) = 1,63 m

Inspired – the downward opening door

As simple as it looks: you have to try it to believe it..

What are the advantages of this idea?

As well as the previously-mentioned advantages in connection with the shaker chamber eg. operation "on the bench" , "under the bench" and "stacked", it is possible for all configurations to use the door to support the shaker table when pulled forward for simpler handling. This saves the need for special tray extraction devices, which are not only costly but often complicated to both operate and clean, or reduce the operational capacity. Such extraction devices are necessary to reach the flasks at the rear.

Whether from the side or the front, the Multitron 2 system works without levers or screws. Through the automatic bolting mechanism, the tray is simple to draw forward and then relocate by pushing backwards.

You don't have to be a basketball star to comfortably access the top chamber. The topmost table is at an operating height of approximately 1.3 metres. And for the lowest level, you don't have to "crawl inside" the machine. Simply pull the table forwards onto the door.

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Do you need additional room to allow for the opening system?

No. No more space is taken up than when the door is split and opens from the side. When the tray is drawn forward, you still only need the same space.

An upward-opening door, which naturally needs scarcely any room for opening, has the disadvantage that it does not clear the incubation chamber fully and its opening restricts free access to the flasks in the deck above. When you wish to lift the tray out, the same space is required at the front as a downwards-opening door

Automatic Tray Release

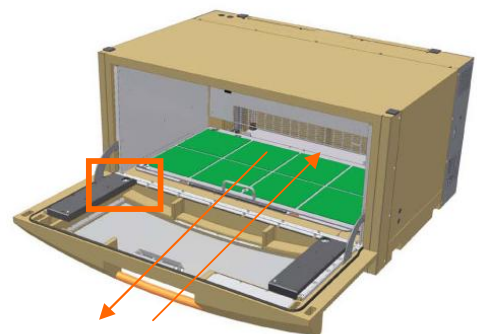
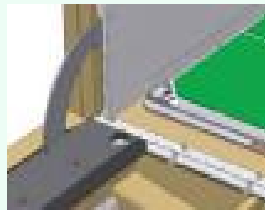
Completely opening the door will automatically trigger the mechanism for release of the tray. To reach items at the rear, the whole tray can be pulled forwards single-handed.

The tray is simply pushed back and the door closed again.

The pull-out aid for very heavy trays

Especially with heavily loaded tables eg. 6 x 5000 ml flasks, the pull out aid greatly facilitates moving the table.

Using roller bearing mounted on each side of the guide rails, the tray can be moved without undue resistance.



Silent operation

An important contribution to the high level of comfort is the very silent operation. If the machine is installed in a room where people are working full-time, this is certainly appreciated.

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Operation is safe and accurate

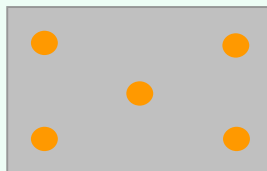
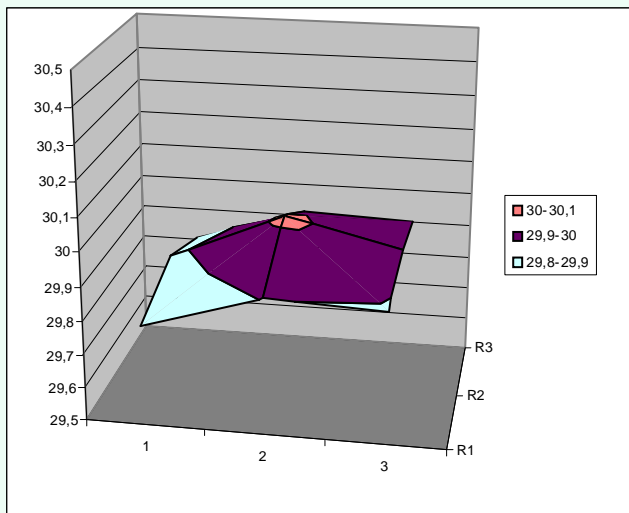
The shaking mechanism

The fact that a simple flask breakage can sometimes cause the whole system to come to a halt is a consequence of the use of the common 3-part eccentric bearing system. This required a new solution to be found. The reason: The eccentrics are always located under the shaker platform where they can be contaminated with spilled culture in the event of a flask breakage. This particularly affects the outer eccentrics and thorough cleaning is practically impossible.

The solution: a novel and currently unique advance in shaker technology; the three dimensional "vertical trapezoid". The shaker table rests on a single, central eccentric bearing. Together with the counterweight/flywheel, these are essentially the only drive components which are located under the shaker table.



	Throw Turn 25 mm	Throw Turn 50 mm
Top deck	350 RPM	250 RPM
Middle Deck	400 RPM	300 RPM
Bottom Deck	400 RPM	350 RPM
Single Unit	400 RPM	350 RPM
Control	1 % of maximum speed	



Temperature Distribution

Eg. With Set point 30°C
5 Measurement points

Temperature Control System

Accuracy is important but the stated temperature precision must also be homogeneous across the whole shaker platform, as far as possible. Also, apart from good insulation, the airflow path should have the shortest possible route.

The housing of the Multitron 2 is free from thermal bridges and has outstanding insulation properties. Together with the precision PID control and cross-flow air ventilators, the short airflow path ensures the same air temperature across the entire width of the table and, therefore, the optimum temperature distribution.

Using a mobile sensor (option) the temperature in a reference flask can be measured and used to provide control based on the liquid temperature.

	Without Cooling	With Cooling
Standard	5 °C above RT to 65°C	12-15 °C** under RT to 65°C
High temperature*	5 °C above RT to 95°C (on request)	12-15°C** under RT to 95°C (on request)
Control precision	0,2 °C (Pt-100 probe).	

* „Thermotron“ – only as a single machine, not stackable

** Top-/Sidecooling

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Cleaning after a flask breakage

Cleaning the base after a flask breakage is easy to do as there are no parts sensible to moisture located under the shaking table. The washing solution can be drained through a special port.



Safety aspects

When the door is opened, the shaker platform brakes gently to a halt and the heating is switched off automatically. The door can only be opened fully to allow tray release when the platform has come to a complete stop. The motor and control electronics are situated above outside the incubation chamber to prevent damage due to spillage of culture. Any spillages collect in the base under the shaker platform and can be easily washed out via a drain port.

A capillary thermostat provides a safety over-ride for the temperature control ensuring the security of both machine and cultures.

A potential-free output is provided for a central supervisory alarm system.

High Load Capacity

Despite the small footprint of 860 x 1070mm, the Multitron 2 has the largest table (850 x 450 mm) in its class. This results in the optimum price/performance comparison when you consider the purchase price against the number of flasks shaken.

Within a footprint as small as a square metre, a three-stack Multitron can, for example, accommodate approximately 144 Erlenmeyer flasks of 250ml capacity or 39 flasks of 2000ml.

Steel Clamps for Erlenmeyer flask	Flask Size (ml)	Quantity per ATM tray
ATK 50	50	131
ATK 100	100	89
ATK 250	250	48
ATK 500	500	31
ATK 1000	1000	19
ATK 2000	2000	13
ATK 3000	3000	9
ATK 5000	5000	6

Quantities relate to fixed tray sizes.

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Optimal Incubation Conditions

Responding to the demands for optimal cell growth, the Multitron 2 is designed to meet this need.

Cooling

When working below room temperature or with lighting systems, cooling is essential. A cooling coil is fitted in each deck in the airflow path, which meets ecological concerns by only circulating coolant via a magnetic valve on demand. The coolant can be supplied in different ways:

- House supply for circulation or via an external chiller
- Central cooling for supply of up to 3 decks
- Side cooling for individual supply to a specific deck

Both central and side-cooling units work with a CFC-free compressor. The advantages over use of a Peltier system are better cooling performance and lower energy requirements.

Lighting

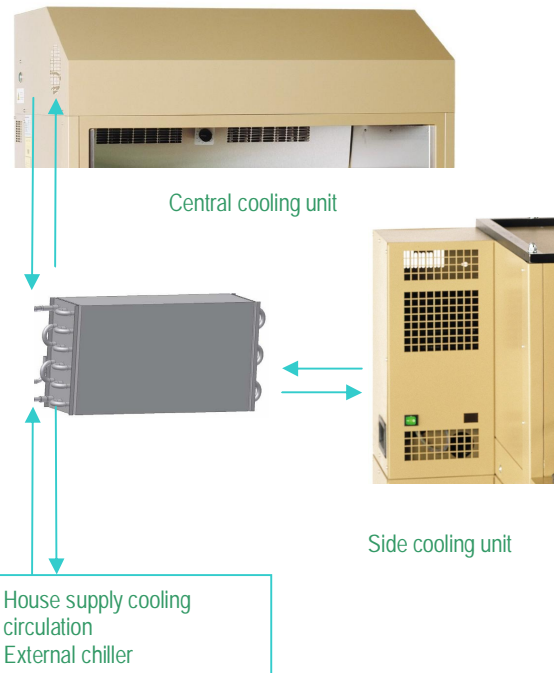
For photosynthetic or phototrophic organisms, different configuration with different spectra and lighting strengths are required. The light source can either be turned on in pairs or dimmed. A special model has been developed for parallel studies with higher light dependence, which has an optimised light distribution over the entire shaking platform.

Using the timer functions and with the aid of chamber darkening, day/night cycles can be programmed.

Humidity

To reduce the evaporation losses due to a long incubation time or very small working volumes (eg. microtitre plates) a humidification system with ultrasonic atomisation can be fitted.

When there are large differences between room temperature and the incubation temperature, a heating system can be fitted to the door to prevent condensation (option).



CO₂ Gassing

Measurement using an infra-red sensor (Option) and controlled CO₂-dosing.

"No problem" Installation

Dimensions and Weight

Consideration of the dimensions and weight allows estimation of the space requirements and floor loading.

So, for example, the weight of a three stack system is less than 450 Kg.

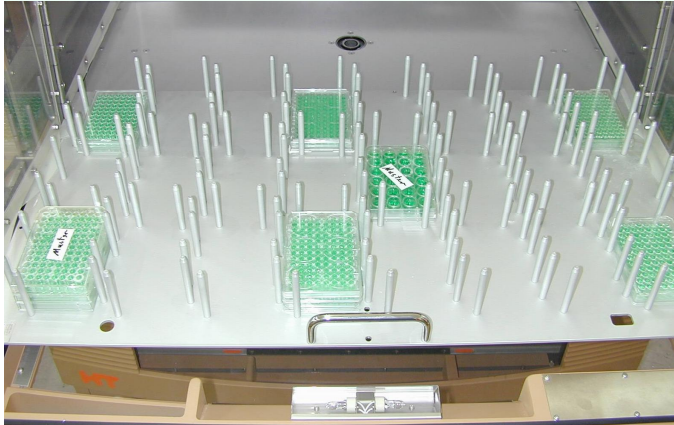
Stability

The stacking system, which is integrated into the side walls to make an "endoskeleton", guarantees an extremely high level of stability. This allows high speeds to be used even in the top deck.

	mm			kg
	Width	Depth	Height	Weight
Single on the bench	1070	860	550	90
2 stack	1070	860	1200	250
3 stack	1070	860	1720	340
With side cooling	1310	860	1720	+ 37 pro system
With central cooling system	1070	860	1990	+ 65 per system

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Comprehensive Range of Accessories



- Universal tray with threaded holes, to accept flask clamps etc which are screwed into place
- Fixed trays with a only size of clamps or holders
- Trays with clamping rollers for flasks, bottles etc.
- Table with adhesive matting (sticky stuff) for any item with a flat base
- Special tables only for microtitre and deep-well plates

Retaining Clamps and Holders

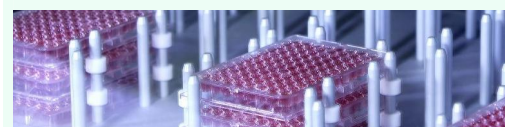
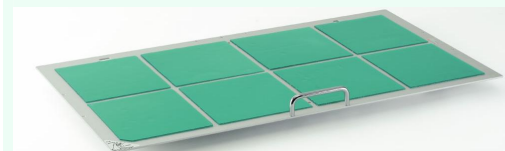
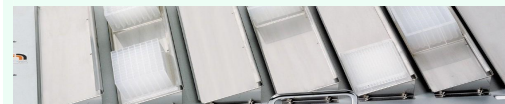
For fixing of shaken items, there is an extensive range of retaining clamps and holders:

- Standard stainless steel clamps for flasks of 25 to 5000ml
- 3-point safety clamps for flasks of 100, 250 and 500ml
- Steel clamps for Fernbach flasks of 1,800ml and 2,800ml.
- Holder for 1, 3 or 7 horizontal Microtitre/deep well plates
- Holder for 1, 3 or 7 angled Microtitre/deep well plates
- Special constructions on request.

Whether Erlenmeyer or Fernbach flasks, tubes or microtitre plates, your shaken items are always securely fixed.

Tables

The tables (shaker trays) of type ATM measuring 850 x 470 mm are the largest in their class. They are available in five configurations



Test Tube Racks etc.

A range of holders are available for various diameters and lengths.

For the best axial mixing at the optimum angle, the support rack can be tilted. By loosening both fixing screws, the rack can be simply detached from the holding frame connected to the shaker.

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Additional equipment

In the basic configuration, the Multitron is supplied with temperature and shaking control systems.

Optionally:

- Extendable shelf for static incubation
- Nozzle for external gas supply
- Darkening
- Mobile temperature probe for measurement in liquid
- PC software for data-logging and control for up to 8 units.

Separate Models

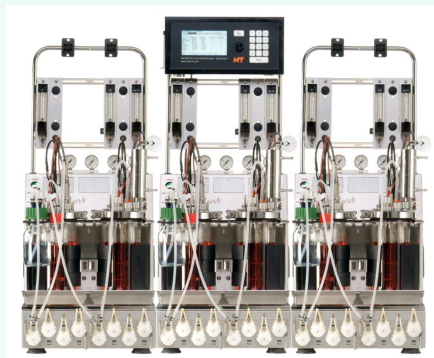
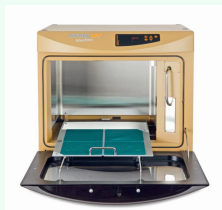
- Microtron. Special for microtitre and deep well plates. Up to 999 RPM
- Thermotron. High temperature machine. Up to 95 °C (on request)

Validation

We can deliver with our qualification service for your process validation.

- documentation
- IQ on site and in-house
- OQ on site and in-house

When you need Shakers and Bioreactors...



... Your Partner for Research and Production

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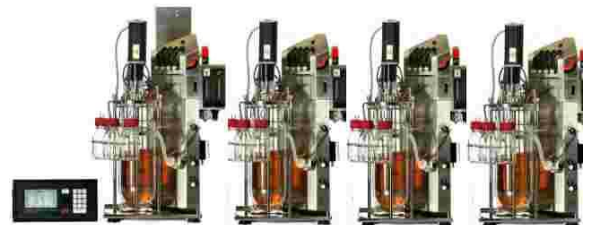
It's all very well to decide you need a better way of doing things but there's no advantage if the equipment is too complex for your needs and not specifically designed with inexperienced or occasional users in mind. Also, the information and support you get must be appropriate to your application and requirements. Finally, when you outgrow this next step you must have a clear pathway to even better things.

You are not alone.



Training and support are vital for users of new equipment. Help and advice about making a step change in production. It will shorten the time for optimisation and prevent costly, time-consuming mistakes which could easily be avoided. A long-term partnership with users results in benefits for everybody with a deeper understanding of ever-changing needs. In education, the ability to communicate ideas and methodologies to tomorrow's researchers can be enhanced by being in touch with experts.

You expect to be able to progress with changing circumstances and it's likely you will eventually hit the limits of simple bench-scale technology. Either a more sophisticated technology is needed, additional capacity or a complete change in methodology to accommodate a move to a production phase. Knowing that this is not an issue gives you peace of mind today with a promise for the future.



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