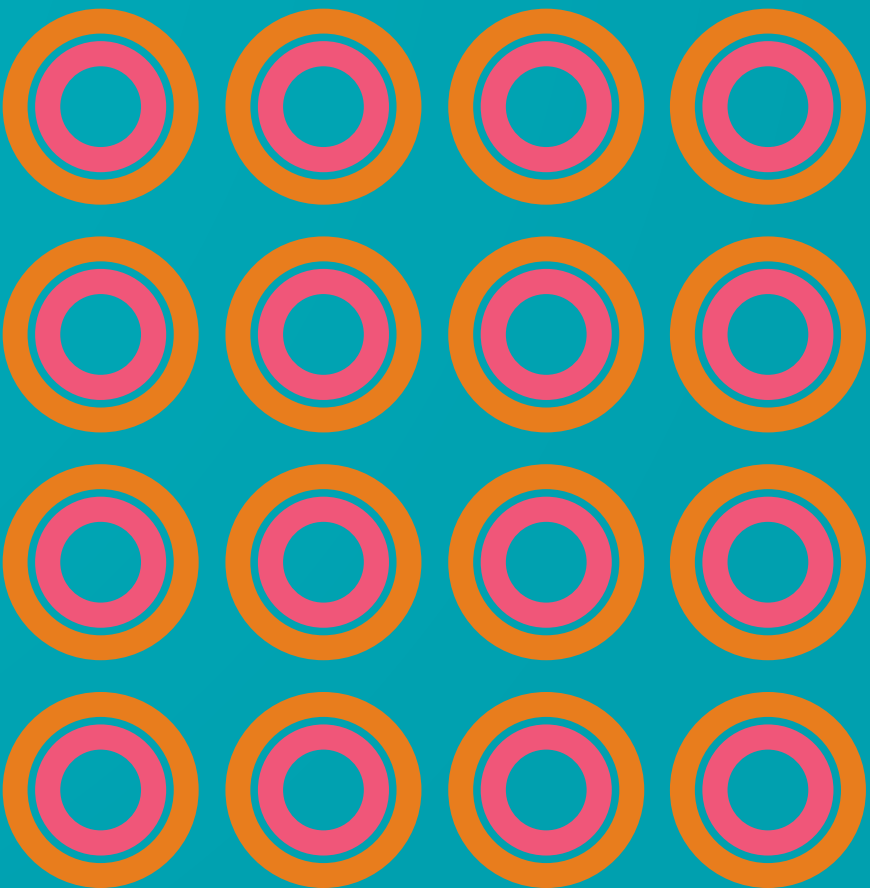


Kuhner shaker



since 1949 **To build the worlds most reliable Shaker**

For over 60 years now, we have been designing, manufacturing and selling Kuhner Shaking Machines and Shaking Incubators.

Our motto is, to build the worlds most reliable shaking machines.

To support research at all possible levels, a dedication to quality and a high priority to customer service.

In supporting our wish to keep the high standards we set ourselves for the future, we acquired the Quality Certificate ISO 9001 in 1994.

Since 1949 our customers have been research laboratories at well known pharmaceutical and biotech companies, institutes and universities from all over the world.

Definitely Swiss made, with a 5 year warranty as proof of our belief in the quality and reliability of a Kuhner machine.







ISF1-X



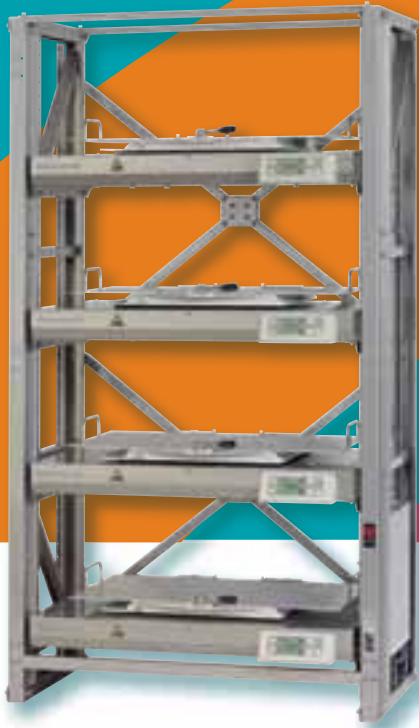
ISF4-X

Level Shaking

Specializing in Shakers with an orbital or linear movement for continuous operation.

Employment of the latest technology for user friendly “at a glance” controls.
Belt less low on energy consumption d.c. magnetic direct drive.

Fully stainless steel interior on all Shaking Incubators. Options of, cooling, controlled humidity, controlled CO₂, UV lighting, photosynthesis, software for ease of validation and much more.



Rack System



Lab-Therm LT-X



ES-X Lab-Shaker



LS-X Lab-Shaker



Change of shaking
diameter only possible with a
Kuhner shaker

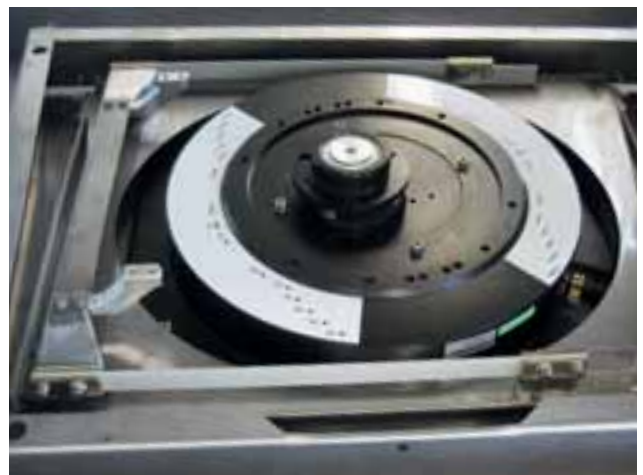
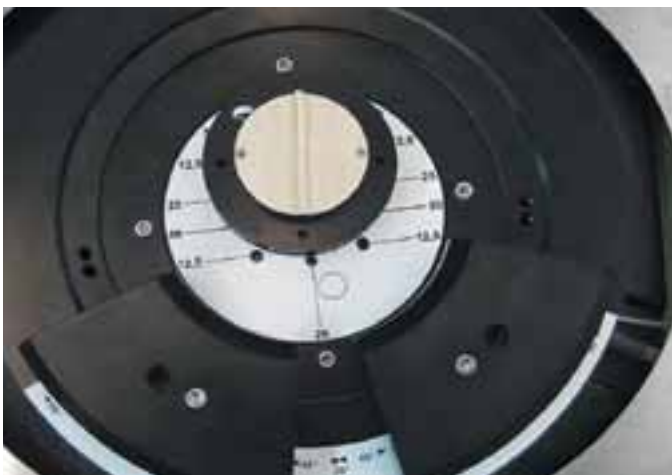
Change of the shaking diameter possible at any time

Very sturdy, dependable, smooth running and energy efficient in house designed D.C. magnetic drive.

For continuous operation with heavy loads up to 25 kg.

The, by now, well known Kuhner parallelogram instead of a triple bearing set-up.

Change of shaking diameter possible at any time (12,5 mm, 25 mm, 50 mm, other shaking diameters feasible)



Control

No nonsense, user friendly, at a glance controls. Every parameter has it's own controller. No fiddling with control buttons or searching through complicated menus.

Precisely controlled temperature.

Precisely controlled temperature. A safe, stainless steel finned heater with a low surface temperature, and controlled by an electronic fully digital PID control which ensures an exact temperature.

The air circulates inside the incubator and flows gently past the heater and evaporator of the CFC free refrigerator unit.

The air does not rush over the flasks, it surrounds them uniformly, therefore no contamination of cultures from one flask to another and an equal evaporation in all flasks.

All PT100 temperature sensors are calibrated!

CFC free foamed insulation fills the inner cavity of the incubator case right to every last corner, so that no condensation can take place. It also keeps the same insulating qualities for the lifetime of the machine.

Controlled humidity to minimize evaporation. The humidifier is based on the principle of an electrically heated evaporation basin with automatic water refill. The relative humidity is measured by means of a capacitive sensor.

A fully electronic digital PID control ensures exact regulation of humidity. Condensation is avoided by heating the door frames and the window.

CFC free foamed insulation



Providing optimised
shaking for cell cultures
our purpose-built
Shaking Incubators
– now available.



CO₂ / UV Photosynthesis

Controlled CO₂ for mammalian cells. A CO₂ controlled atmosphere in the Shaker-incubator allows exact pH adjustment of the cell culture medium. The operation of the CO₂ sensor is based on the NDIR single beam dual-wave length principle.

The CO₂ is added to the circulating air in small quantities by a magnetic valve. Electronic, fully digital PID control incorporating a microprocessor ensures exact matching of the gas flow and accurately maintains the desired CO₂-value.



Integrated UV lamp for sterilization.

Photosynthesis for the growing of plant cells.

Controlled CO₂ for mammalian cells.



BioProcess Monitoring

BPM-60



BioProcess Monitoring, BPM-60 non invasive online measurement of dissolved oxygen and pH in shake flasks.



The BMP-60 makes it possible to measure, online, the dissolved Oxygen and/or the pH value in a shaking flask.

An into the shaking table integrated socket makes a simple data communication and power supply possible.



Up to eight process parameters can be stored and displayed with the ISIS software

250 ml

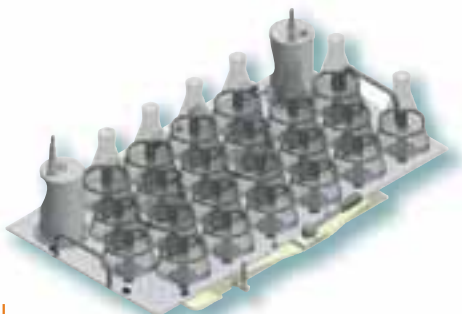
advantages

- + online signal
 - + reproducibility
 - + optimised cultivation conditions
 - + made for PAT
-

Range

O₂ 0–100 %
pH 5.5–8.5

500 ml



1000 ml



2000 ml





online oxygen and pH

| BPM-60 | oxygen | pH |
|---|--|--|
| ports | one port for glass fibre (side), two for CAN-BUS (top) | |
| dimension | height: 156 mm diameter: 84 mm diameter of connector ring: 108 mm | |
| signal | O ₂ to CAN Bus | pH to CAN Bus |
| holder | with optical unit | |
| optical unit | single version: O ₂ or double version: O ₂ and pH | |
| flask size | 250, 500, 1000, 2000 ml | |
| ISIS | software for monitoring, calibration, controlling | |
| monitoring | 8 additional process parameters (8 x O ₂ or 4 x O ₂ and pH) | |
| calibration | pre-calibrated sensor flasks | |
| recalibration | one point recalibration is possible | |
| applicable | 98/NT/2000/XP/Vista | |
| GMP | 21 CFR Part 11 compliance (audit trail) | |
| sensor flask | oxygen | pH |
| measuring range | 0–100 % O ₂ | 5.5–8.5 pH |
| response time (t ₉₀) at 25 °C | 30 sec | 30 sec |
| resolution | ± 0.01 % O ₂ at 0.21 % O ₂ ± 0.1 % O ₂ at 20.9 % O ₂ | ± 0.01 pH at pH=7 |
| accuracy | ± 0.05 % O ₂ at 0.2 % O ₂ ± 0.4 % O ₂ at 20.9 % O ₂ | ± 0.05 pH at pH=7 with one-point adjustment ± 0.10 pH at pH=7 with pre-calibration |
| drift | < 0.015 % O ₂ per day (sampling interval of 1 min.) | |
| temperature range | from 5 to 50 °C | |
| compatibility | aqueous solutions, ethanol, methanol (max. 10 % v/v), pH2–10 | |
| cross-sensitivity | typically no cross-sensitivity in culture media | reduced to ionic strength (salinity), a high concentration of small fluorescent molecules in the visible range can interfere |
| storage stability | 18 months provided the sensor is stored in the dark | |
| calibration | sensor flask are pre-calibrated, a one point calibration is possible at the beginning of the experiment, when the medium conditions are defined (pH, pO ₂) | |
| sterilization | sensor flask are delivered irradiated | |
| resterilization | steam sterilisation ethylene oxide gamma irradiation | is not recommended |
| tray plug | 1: 24 V DC + 2: 24 V DC – 3: CAN-H 4: CAN-L 5: CAN-GND | |

Lab-Therm LT-X



Shaking

Heating

Lighting

EX size tray 500 x 420 mm or

E size tray 420 x 420 mm

Stackable, max. 2 units

Pedestal for 1 or 2 units, option

Cooling, option

Controlled humidity, option

Heated window, with controlled humidity

Blackened window, option

Controlled CO₂, option

Photosynthesis, option

UV, option

Dual table, option

Stationary tray, option

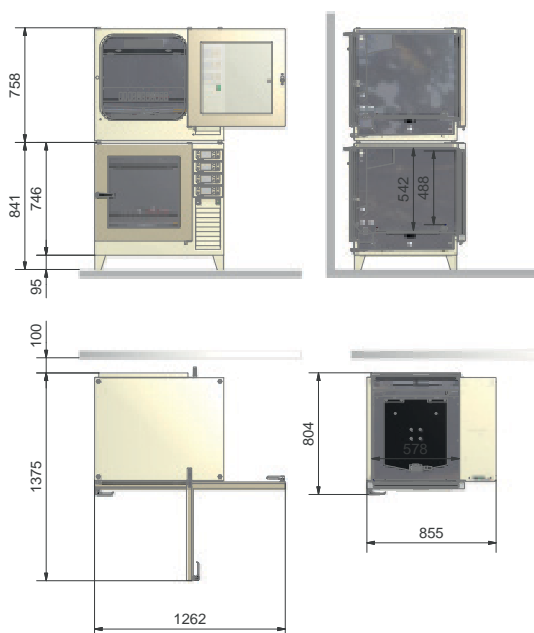
ISIS software option

IQ-OQ, option

And much more ...

Dimensions Lab-Therm LT-X

measurements in mm



Very reliable electro-magnetic direct drive

All stainless steel interior

Foamed insulation

Hermetically sealed double glazed window

User-friendly operation
(for each parameter it's own control)

Energy conscious drive and cooling system

Easy to stack, without use of any special stacking
gadgets or tools

A 5 YEAR WARRANTY



| Technical data | SMX1700 | SMX1701 | SMX1703 |
|---------------------|----------------|----------------|----------------|
| Refrigerator | no | yes | yes |
| Humidity control | no | no | yes |
| Temperature minimum | ambient +10 °C | ambient –15 °C | ambient –15 °C |
| Temperature maximum | 80 °C | 80 °C | 80 °C |
| Humidity maximum | – | – | 85 % r.h. |
| Power consumption | < 800 W | < 950 W | < 1300 W |

Machine

| | |
|-----------------------|---|
| Volume | 200 litre |
| Weight (with cooling) | 170 kg |
| Illumination | Halogen (2 x 10 W) |
| Operating menu in | English, French, German, Spanish, Italian |
| Interface, standard | CAN-Bus |
| Interface, optional | USB, Ethernet, digital, analogue |
| Ambient temperature | 10 °C up to 35 °C |

Temperature

| | |
|---------------------|-------------------|
| Setting, digital | 0.1 °C |
| Accuracy, absolute | ± 0.30 °C (37 °C) |
| Principle of sensor | Pt-100 |
| Power of heating | 500 W |
| Power of cooling | 90...155 W |
| Air circulation | 160 m³/h |

Humidity

(SMX1703)

| | |
|---------------------|------------|
| max. at 25...55 °C | 85 % r.h. |
| Setting, digital | 1 % r.h. |
| Accuracy, absolute | ± 2 % r.h. |
| Principle of sensor | capacitive |
| Water refill | automatic |
| Water heater | 180 W |
| Door heater | 90 W |

Shaking unit

| | |
|--------------------|-------------------|
| Tray, size | EX (500 x 420 mm) |
| Loading, maximum | 25 kg |
| Setting, digital | 1 rpm |
| Accuracy, absolute | ± 0.1 rpm |
| Timer | 1s ... 999 h |
| Acceleration | controlled |
| Active brake | adjustable |
| Stop on position | adjustable |

| | |
|----------------------|--------------|
| Shaking motion | Speed |
| * orbital, Ø 12.5 mm | 20...500 rpm |
| * orbital, Ø 25.0 mm | 20...400 rpm |
| * orbital, Ø 50.0 mm | 20...300 rpm |
| * linear 12.5 mm | 20...400 rpm |
| * linear 25.0 mm | 20...300 rpm |
| * linear 50.0 mm | 20...200 rpm |
| * can be changed | |

CO₂

(SMX1034)

| | |
|-------------------------|----------------------------------|
| Principle of sensor | Infrared, NDIR |
| Measuring range | 0...20 % CO ₂ |
| Setting, digital | 0.1 % |
| Accuracy, absolute | ± 0.42 % at 20 % CO ₂ |
| Non-linearity | < 0.1 % |
| Temperature range | 5...60 °C |
| CO ₂ -supply | max. 1 bar overpressure |

Mains connection

| | |
|----------|----------------------|
| SMX1021: | 220–240 V / 50–60 Hz |
| SMX1022: | 190–210 V / 50–60 Hz |
| SMX1023: | 110–120 V / 50–60 Hz |
| SMX1024: | 95–105 V / 50–60 Hz |

| Tray size mm | | Flask size in ml | | | | | | | | | | | | | | |
|--------------|-----------|------------------|----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| | | 25 | 50 | 100 | 150 | 200 | 250 | 300 | 500 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 6000 |
| E | 420 x 420 | 81 | 50 | 39 | 30 | 20 | 18 | 15 | 12 | 9 | 5 | 5 | 4 | 2 | 2 | 1 |
| EX | 500 x 420 | 90 | 62 | 42 | 36 | 27 | 22 | 21 | 14 | 9 | 8 | 6 | 4 | 3 | 2 | 2 |
| EU | 420 x 420 | 80 | 49 | 36 | 26 | 24 | 20 | 18 | 14 | 9 | 5 | 5 | 4 | 2 | 2 | 1 |
| EXU | 500 x 420 | 90 | 56 | 45 | 35 | 27 | 24 | 22 | 16 | 10 | 6 | 5 | 5 | 3 | 2 | 2 |

ISF1-X



Shaking

Heating

Lighting

F size tray 800 x 420 mm

Stackable, max 3 units

Pedestal for 1 or 2 units, option

Cooling, option

Controlled humidity, option

Heated window, with controlled humidity

Blackened window, option

Controlled CO₂, option

UV, option

Photosynthesis, option

Pull-out tray, option

Dual table, option

Stationary tray, option

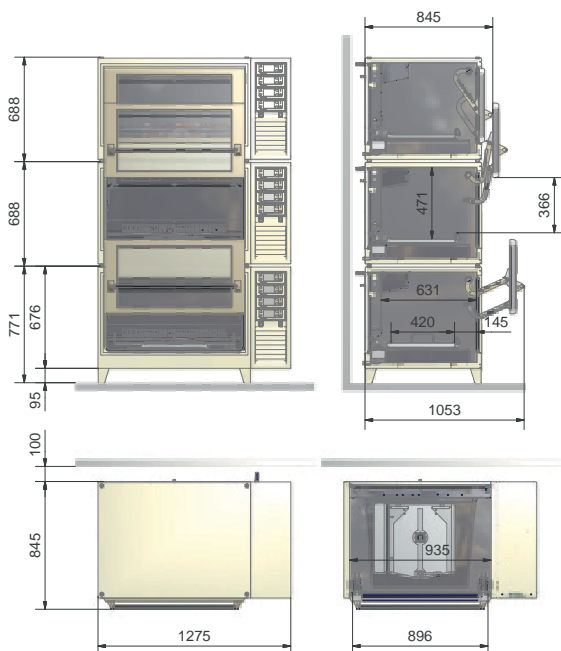
ISIS software, option

IQ-OQ, option

And much more ...

Dimensions ISF1-X

measurements in mm



Very reliable electro-magnetic direct drive

All stainless steel interior

Foamed insulation

Hermetically sealed double glazed window

User-friendly operation
(for each parameter it's own control)

Energy conscious drive and cooling system

Easy to stack, without use of any special stacking
gadgets or tools

A 5 YEAR WARRANTY



| Technical data | SMX1500 | SMX1501 | SMX1503 |
|---------------------|----------------|----------------|----------------|
| Refrigerator | no | yes | yes |
| Humidity control | no | no | yes |
| Temperature minimum | ambient +10 °C | ambient –15 °C | ambient –15 °C |
| Temperature maximum | 80 °C | 80 °C | 80 °C |
| Humidity maximum | – | – | 85 % r.h. |
| Power consumption | < 1300 W | < 1500 W | < 2000 W |

Machine

| | |
|-----------------------|---|
| Volume | 350 l |
| Weight (with cooling) | 210 kg |
| Illumination | Halogen |
| Operating menu in | English, French, German, Italian, Spanish |
| Interface, standard | CAN-Bus |
| Interface, optional | USB, Ethernet, digital, analogue |
| Ambient temperature | 10 °C up to 35 °C |

Temperature

| | |
|---------------------|-------------------|
| Setting, digital | 0.1 °C |
| Accuracy, absolute | ± 0.30 °C (37 °C) |
| Principle of sensor | Pt-100 |
| Power of heating | 1000 W |
| Power of cooling | 155...270 W |
| Air circulation | 300 m³/h |

Humidity

(SMX1503)

| | |
|---------------------|------------|
| max. at 25...55 °C | 85 % r.h. |
| Setting, digital | 1 % r.h. |
| Accuracy, absolute | ± 2 % r.h. |
| Principle of sensor | capacitive |
| Water refill | automatic |
| Water heater | 300 W |
| Door heater | 100 W |

Shaking unit

| | |
|--------------------|------------------|
| Tray, size | F (800 × 420 mm) |
| Loading, maximum | 25 kg |
| Setting, digital | 1 rpm |
| Accuracy, absolute | ± 0.1 rpm |
| Timer | 1s ... 999 h |
| Acceleration | controlled |
| Active brake | adjustable |
| Stop on position | adjustable |

| | |
|----------------------|--------------|
| Shaking motion | Speed |
| * orbital, Ø 12.5 mm | 20...500 rpm |
| * orbital, Ø 25.0 mm | 20...400 rpm |
| * orbital, Ø 50.0 mm | 20...300 rpm |
| * linear 12.5 mm | 20...400 rpm |
| * linear 25.0 mm | 20...300 rpm |
| * linear 50.0 mm | 20...200 rpm |
| * can be changed | |

CO₂

(SMX1034)

| | |
|-------------------------|----------------------------------|
| Principle of sensor | Infrared, NDIR |
| Measuring range | 0...20 % CO ₂ |
| Setting, digital | 0.1 % |
| Accuracy, absolute | ± 0.42 % at 20 % CO ₂ |
| Non-linearity | < 0.1 % |
| Temperature range | 5...60 °C |
| CO ₂ -supply | max. 1 bar overpressure |

Mains

| | |
|----------|----------------------|
| SMX1021: | 220–240 V / 50–60 Hz |
| SMX1022: | 190–210 V / 50–60 Hz |
| SMX1023: | 110–120 V / 50–60 Hz |
| SMX1024: | 95–105 V / 50–60 Hz |

Tray size mm

Flask size in ml

| | | 25 | 50 | 100 | 150 | 200 | 250 | 300 | 500 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 |
|----|-----------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| F | 800 x 420 | 153 | 100 | 74 | 60 | 40 | 40 | 30 | 26 | 16 | 12 | 9 | 8 | 5 | 4 |
| FU | 800 x 420 | 113 | 100 | 72 | 50 | 44 | 40 | 37 | 27 | 16 | 12 | 9 | 8 | 5 | 4 |

ISF4-X



Shaking, up to 4 (5) shaking units

Heating

Lighting

F size tray 800 x 420 mm

Cooling, option

Controlled humidity, option

Heated window, with controlled humidity

Blackened window, option

Controlled CO₂, option

UV, option

Photosynthesis, option

Pull-out tray, option

Dual table, option

Stationary tray, option

Cover for control, option

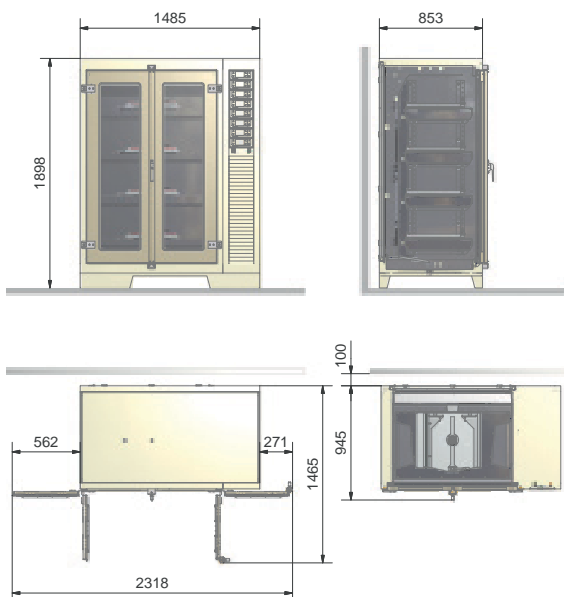
ISIS software, option

IQ-OQ, option

And much more ...

Dimensions ISF4-X

measurements in mm



Very reliable electro-magnetic direct drives

All stainless steel interior

Foamed insulation

Hermetically sealed double glazed windows

User-friendly operation
(for each parameter it's own control)

Energy conscious drives and cooling system

Large shaking capacity on small floor space

A 5 YEAR WARRANTY

| Technical data | SMX1600 | SMX1601 | SMX1603 |
|---------------------|----------------|----------------|----------------|
| Refrigerator | no | yes | yes |
| Humidity control | no | no | yes |
| Temperature minimum | ambient +10 °C | ambient –15 °C | ambient –15 °C |
| Temperature maximum | 80 °C | 80 °C | 80 °C |
| Humidity maximum | – | – | 85 % r.h. |
| Power consumption | < 1700 W | < 2000 W | < 2600 W |

Machine (incubator)

| | |
|-----------------------|---|
| Volume | 800 litre |
| Weight (without SF-X) | 520 kg (with cooling) |
| Illumination | 2 fl lamps |
| Operating menu in | English, French, German, Italian, Spanish |
| Interface, standard | CAN-Bus |
| Interface, optional | USB, Ethernet, digital, analogue |
| Ambient temperature | 10 °C up to 35 °C |

Temperature

| | |
|---------------------|-------------------|
| Setting, digital | 0.1 °C |
| Accuracy, absolute | ± 0.30 °C (37 °C) |
| Principle of sensor | Pt-100 |
| Power of heating | 1000 W |
| Power of cooling | 250...420 W |
| Air circulation | 700 m³/h |

Shaking unit SF-X

(SMX1610)

| | |
|----------------------|------------------|
| Tray, size | F (800 × 420 mm) |
| Loading, maximum | 25 kg |
| Setting, digital | 1 rpm |
| Accuracy, absolute | ± 0.1 rpm |
| Timer | 1s ... 999 h |
| Acceleration | controlled |
| Active brake | adjustable |
| Stop on position | adjustable |
| Shaking unit-weight | 55 kg each. |
| Shaking motion | Speed |
| * orbital, Ø 12.5 mm | 20...500 rpm |
| * orbital, Ø 25.0 mm | 20...400 rpm |
| * orbital, Ø 50.0 mm | 20...300 rpm |
| * linear 12.5 mm | 20...400 rpm |
| * linear 25.0 mm | 20...300 rpm |
| * linear 50.0 mm | 20...200 rpm |
| * can be changed | |

Humidity

(SMX1603)

| | |
|---------------------|-------------|
| max. at 25...55 °C | 85 % r.h. |
| Setting, digital | 1 % r.h. |
| Accuracy, absolute | +– 2 % r.h. |
| Principle of sensor | capacitive |
| Water refill | automatic |
| Water heater | 300 W |
| Door heater | 220 W |

CO₂

(SM1034)

| | |
|-------------------------|-----------------------------------|
| Principle of sensor | infrared, NDIR |
| Measuring range | 0.....20 % CO ₂ |
| Setting, digital | 0.10 % |
| Accuracy, absolute | +– 0.42 % at 20 % CO ₂ |
| Non-linearity | < 0.1 % |
| Temperature range | 5....60 °C |
| CO ₂ -supply | max. 1 bar overpressure |

Mains

| | |
|---------|----------------------|
| SMX1021 | 220–240 V / 50–60 Hz |
| SMX1022 | 190–210 V / 50–60 Hz |

| Tray size mm | | Flask size in ml | | | | | | | | | | | | | | |
|--------------|-----------|------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| | | 25 | 50 | 100 | 150 | 200 | 250 | 300 | 500 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 6000 |
| F | 800 x 420 | 153 | 100 | 74 | 60 | 40 | 40 | 30 | 26 | 16 | 12 | 9 | 8 | 5 | 4 | 3 |
| FU | 800 x 420 | 113 | 100 | 72 | 50 | 44 | 40 | 37 | 27 | 16 | 12 | 9 | 8 | 5 | 4 | 4 |

Our motto being, to build the worlds most reliable shaking machines.

Just tell us your requirements!
Send us a drawing, or better still,
send us a sample of the container
that needs shaking and we will
build the perfect holder.

Every kind of platform to shake
strangely formed bottles with
extruding rubber valves and plastic
tubing connected to other containers
have been manufactured und
supplied to satisfied customers.



Custom-made accessories,
an every-day
occurrence for us.





LS-X Lab-Shaker

Very reliable and sturdy bench shaking machine.

Magnetic, direct d.c. drive built for continuous, maintenance free operation.

Extremely low energy consumption.

Load, typical up to 25 kg.

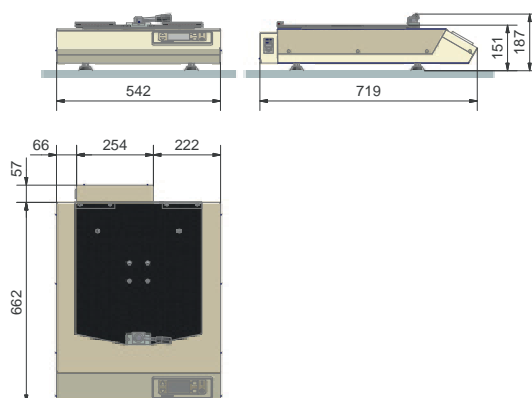
Orbital or linear movement.

A 5 year warranty

| Technical data | Lab-Shaker LS-X SMX1200 |
|----------------------|---|
| 1 x Tray, size | E (420 x 420 mm) |
| or | EX (500 x 420 mm) |
| or | F (800 x 420 mm) |
| Loading, maximum | 25 kg |
| Operating menu in | English, French, German, Italian, Spanish |
| Interface, standard | CAN-Bus |
| Interface, optional | USB, Ethernet, digital, analogue |
| Ambient temperature | 0 °C up to 60 °C |
| Consumption, maximum | 65 W (130 W with high torque drive SMX1031) |
| Consumption, typical | 25 W |
| Weight | 58 kg |

Dimensions LS-X Lab-Shaker

measurements in mm



Applicable for both types, LS-X and ES-X

| | | | |
|----------------------|--------------|-------------------------|----------------------|
| Setting, digital | 1 rpm | Acceleration | controlled |
| Accuracy, absolute | ± 0.1 rpm | Active brake | adjustable |
| Timer | 1s ... 999h | Stop on position | adjustable |
| Shaking motion | Speed | Mains connection | |
| * orbital, Ø 12.5 mm | 20...500 rpm | SMX1021: | 220-240 V / 50-60 Hz |
| * orbital, Ø 25.0 mm | 20...400 rpm | SMX1022: | 190-210 V / 50-60 Hz |
| * orbital, Ø 50.0 mm | 20...300 rpm | SMX1023: | 110- 20 V / 50-60 Hz |
| * linear 12.5 mm | 20...400 rpm | SMX1024: | 95-105 V / 50-60 Hz |
| * linear 25.0 mm | 20...300 rpm | | |
| * linear 50.0 mm | 20...200 rpm | | |
| *can be changed | | | |



ES-X Lab-Shaker

The ES-X is a specially designed shaker for installation in incubators.

Intended for working in high temperatures and high humidity.

Motor casing made of stainless steel

Very reliable, hard working and maintenance free magnetic drive made for continuous operation

Extremely low energy consumption.

Suitable for custom-made shakers

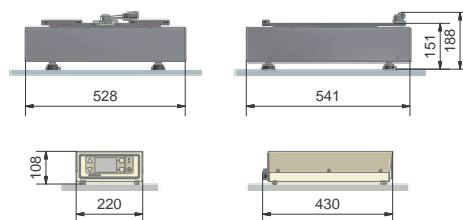
Special version for robotics

A 5 year warranty

| Technical data | Lab-Shaker ES-X SMX1300 |
|----------------------|---|
| 1 x Tray, size | E (420 × 420 mm) |
| or | EX (500 × 420 mm) |
| or | F (800 × 420 mm) |
| Loading, maximum | 25 kg |
| Operating menu in | English, French, German, Italian, Spanish |
| Interface, standard | CAN-Bus |
| Interface, optional | USB, Ethernet, digital, analogue |
| Ambient temperature | -20 °C up to 80 °C 95 % r.H. |
| Control unit | 0 °C up to 60 °C |
| Consumption, maximum | 65 W |
| | 130 W with high torque drive SMX1031 |
| Consumption, typical | 25 W |
| Weight | 60 kg |

Dimensions ES-X Lab-Shaker

measurements in mm



| Tray size mm | | Flask size in ml | | | | | | | | | | | | | | |
|--------------|-----------|------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| | | 25 | 50 | 100 | 150 | 200 | 250 | 300 | 500 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 6000 |
| E | 420 × 420 | 81 | 50 | 39 | 30 | 20 | 18 | 15 | 12 | 9 | 5 | 5 | 4 | 2 | 2 | 1 |
| EX | 500 × 420 | 90 | 62 | 42 | 36 | 27 | 22 | 21 | 14 | 9 | 8 | 6 | 4 | 3 | 2 | 2 |
| F | 800 × 420 | 153 | 100 | 74 | 60 | 40 | 40 | 30 | 26 | 16 | 12 | 9 | 8 | 5 | 4 | 3 |
| EU | 420 × 420 | 80 | 49 | 36 | 26 | 24 | 20 | 18 | 14 | 9 | 5 | 5 | 4 | 2 | 2 | 1 |
| EXU | 500 × 420 | 90 | 56 | 45 | 35 | 27 | 24 | 22 | 16 | 10 | 6 | 5 | 5 | 3 | 2 | 2 |
| FU | 800 × 420 | 113 | 100 | 72 | 50 | 44 | 40 | 37 | 27 | 16 | 12 | 9 | 8 | 5 | 4 | 4 |

Rack System

plenty of space



An adaptable and space saving shaker system for environmental rooms, laboratories, corridors etc.

Very reliable electro-magnetic direct drives

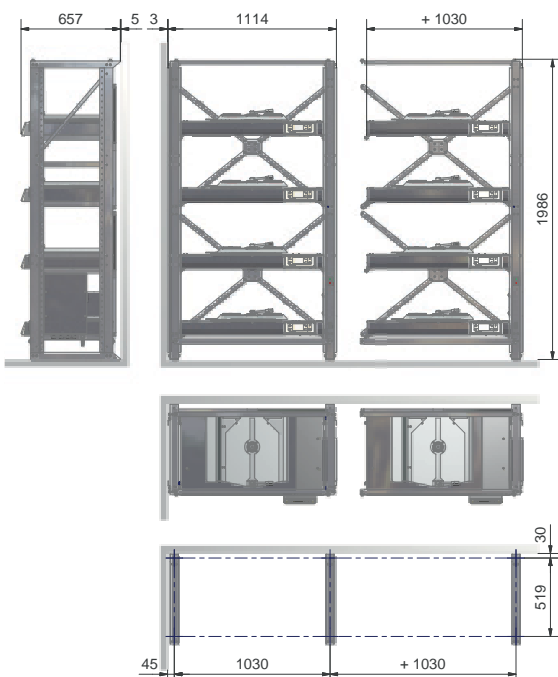
Rack and shaking units made of stainless steel

Size and configuration can be altered at any given time

Can be used in humidified rooms due to hermetically sealed electronic parts

Dimensions Rack System

measurements in mm



F size tray 800 × 400 mm

Pull-out trays, option

Dual table, option

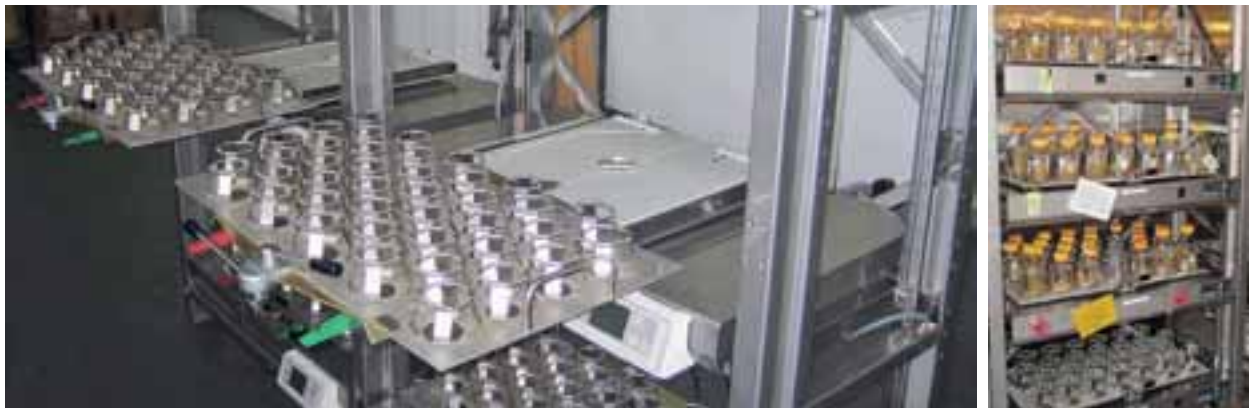
Stationary trays, option

Photosynthesis, option

ISIS software, option

IQ-OQ, option

And much more ...



Technical data **SBM SMX1900, SEM SMX1901**

| | |
|----------------------|---|
| Weight SBM | 54 kg |
| Weight SS-X | 60 kg |
| Operating menu in | English, French, German, Italian, Spanish |
| Interface, standard | CAN-Bus |
| Interface, optional | USB, Ethernet, digital, analogue |
| Ambient temperature | 0 °C up to 60 °C |
| Consumption, maximum | 240 W (4 machines, max. Acceleration) |
| Consumption, maximum | 480 W (4 machines with high torque drive) |
| Consumption, typical | 50 W (4 machines) |

Shaking unit **SS-X** **SMX 1910**

| | |
|--------------------|------------------|
| Tray, size | F (800 × 420 mm) |
| Loading, maximum | 25 kg |
| Setting, digital | 1 rpm |
| Accuracy, absolute | ± 0.1 rpm |
| Timer | 1s ... 999 h |
| Acceleration | controlled |
| Active brake | adjustable |
| Stop on position | adjustable |

Shaking motion

Speed

Mains

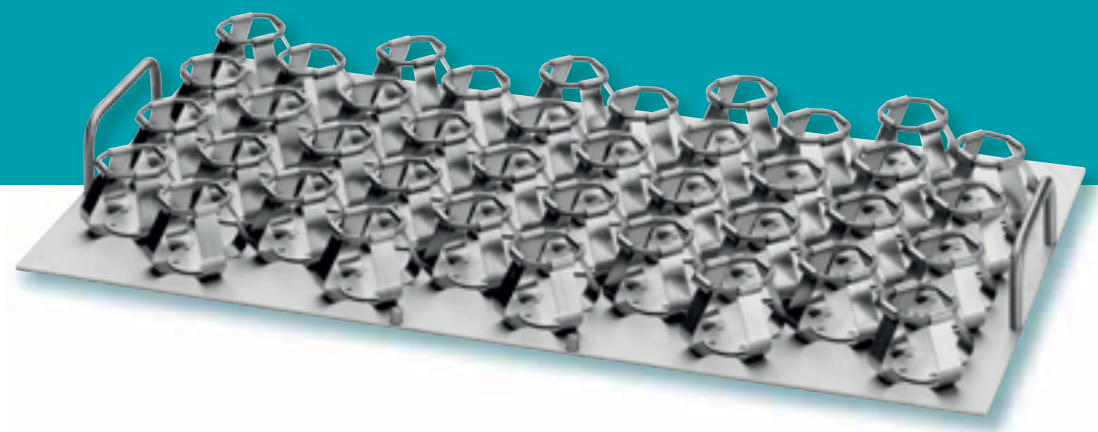
| | | |
|----------------------|--------------|-------------------------------|
| * orbital, Ø 12.5 mm | 20...500 rpm | SMX1021: 220–240 V / 50–60 Hz |
| * orbital, Ø 25.0 mm | 20...400 rpm | SMX1022: 190–210 V / 50–60 Hz |
| * orbital, Ø 50.0 mm | 20...300 rpm | SMX1023: 110–120 V / 50–60 Hz |
| * linear 12.5 mm | 20...400 rpm | SMX1024: 95–105 V / 50–60 Hz |
| * linear 25.0 mm | 20...300 rpm | |
| * linear 50.0 mm | 20...200 rpm | |
| * can be changed | | |

Common power supply for 4 shaking units. 24 VAC between rack-shaking units only.

Tray size mm

Flask size in ml

| | | 25 | 50 | 100 | 150 | 200 | 250 | 300 | 500 | 1000 | 1500 | 2000 | 3000 | 4000 | 5000 | 6000 |
|----|-----------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| F | 800 × 420 | 153 | 100 | 74 | 60 | 40 | 40 | 30 | 26 | 16 | 12 | 9 | 8 | 5 | 4 | 3 |
| FU | 800 × 420 | 113 | 100 | 72 | 50 | 44 | 40 | 37 | 27 | 16 | 12 | 9 | 8 | 5 | 4 | 4 |



E-trays with fixed stainless steel clamps: 420 × 420 mm

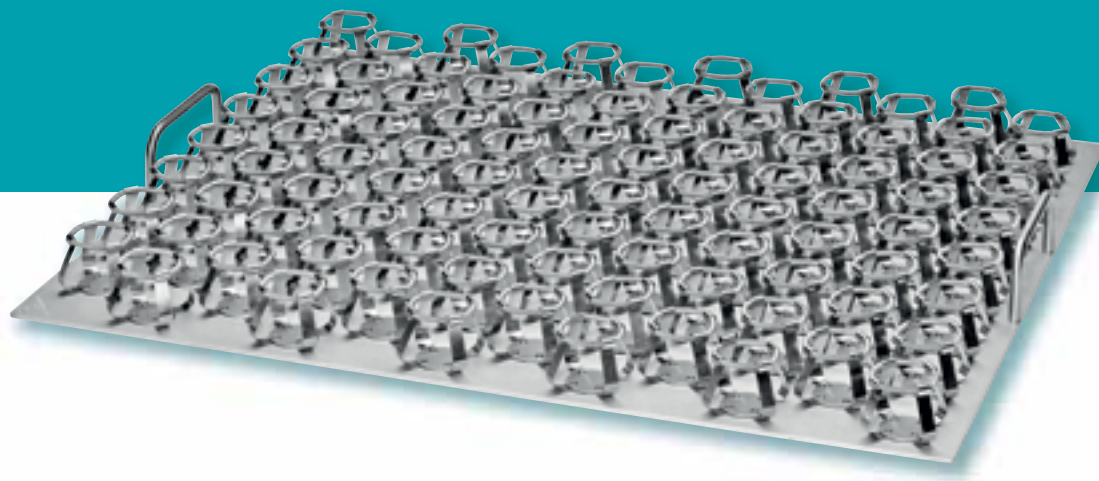
E-trays with fixed stainless steel clamps: 420 × 420 mm

| | | |
|----------|-------------|-----------|
| SM320025 | E - 25 ml | 81 clamps |
| SM320050 | E - 50 ml | 50 clamps |
| SM320100 | E - 100 ml | 39 clamps |
| SM320125 | E - 125 ml | 30 clamps |
| SM320150 | E - 150 ml | 30 clamps |
| SM320200 | E - 200 ml | 20 clamps |
| SM320250 | E - 250 ml | 18 clamps |
| SM320300 | E - 300 ml | 15 clamps |
| SM320500 | E - 500 ml | 12 clamps |
| SM321000 | E - 1000 ml | 9 clamps |
| SM321500 | E - 1500 ml | 5 clamps |
| SM322000 | E - 2000 ml | 5 clamps |
| SM323000 | E - 3000 ml | 4 clamps |
| SM324000 | E - 4000 ml | 2 clamps |
| SM325000 | E - 5000 ml | 2 clamps |
| SM326000 | E - 6000 ml | 1 clamp |

EX-trays with fixed stainless steel clamps: 500 × 420 mm

EX-trays with fixed stainless steel clamps: 500 × 420 mm

| | | |
|-----------|--------------|-----------|
| SMX320025 | EX - 25 ml | 90 clamps |
| SMX320050 | EX - 50 ml | 62 clamps |
| SMX320100 | EX - 100 ml | 42 clamps |
| SMX320125 | EX - 125 ml | 36 clamps |
| SMX320150 | EX - 150 ml | 36 clamps |
| SMX320200 | EX - 200 ml | 27 clamps |
| SMX320250 | EX - 250 ml | 24 clamps |
| SMX320300 | EX - 300 ml | 21 clamps |
| SMX320500 | EX - 500 ml | 14 clamps |
| SMX321000 | EX - 1000 ml | 9 clamps |
| SMX321500 | EX - 1500 ml | 8 clamps |
| SMX322000 | EX - 2000 ml | 6 clamps |
| SMX323000 | EX - 3000 ml | 4 clamps |
| SMX324000 | EX - 4000 ml | 3 clamps |
| SMX325000 | EX - 5000 ml | 2 clamps |
| SMX326000 | EX - 6000 ml | 2 clamps |



F-trays with fixed stainless steel clamps: 800 × 420 mm

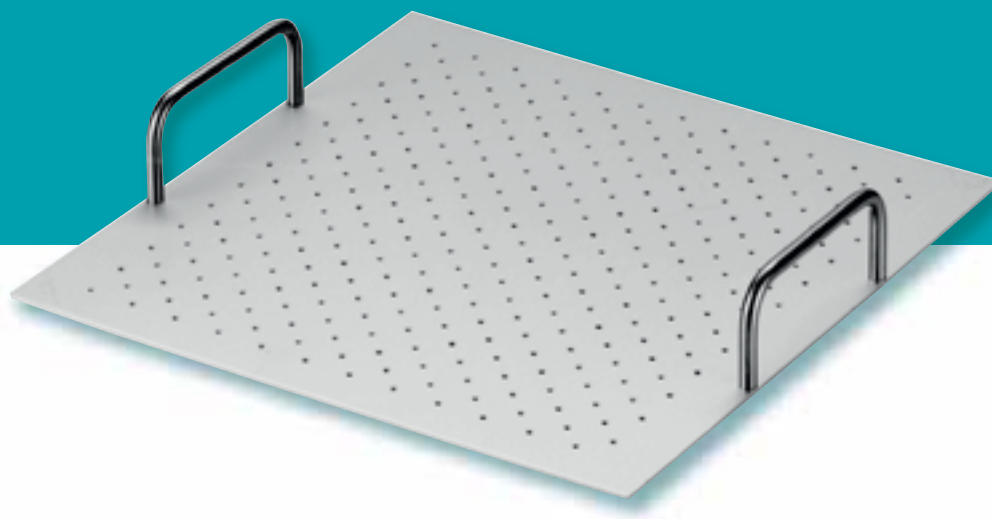
F-trays with fixed stainless steel clamps: 800 x 420 mm

| | | |
|----------|-------------|------------|
| SM330025 | F - 25 ml | 153 clamps |
| SM330050 | F - 50 ml | 100 clamps |
| SM330100 | F - 100 ml | 74 clamps |
| SM330125 | F - 125 ml | 60 clamps |
| SM330150 | F - 150 ml | 60 clamps |
| SM330200 | F - 200 ml | 40 clamps |
| SM330250 | F - 250 ml | 40 clamps |
| SM330300 | F - 300 ml | 30 clamps |
| SM330500 | F - 500 ml | 26 clamps |
| SM331000 | F - 1000 ml | 16 clamps |
| SM331500 | F - 1500 ml | 12 clamps |
| SM332000 | F - 2000 ml | 9 clamps |
| SM333000 | F - 3000ml | 8 clamps |
| SM334000 | F - 4000 ml | 5 clamps |
| SM335000 | F - 5000 ml | 4 clamps |
| SM336000 | F - 6000 ml | 3 clamps |

C-trays with fixed stainless steel clamps: 800 × 660 mm

C-trays with fixed stainless steel clamps: 800 x 660 mm

| | | |
|----------|-------------|------------|
| SM340025 | C - 25 ml | 238 clamps |
| SM340050 | C - 50 ml | 153 clamps |
| SM340100 | C - 100 ml | 116 clamps |
| SM340125 | C - 125 ml | 96 clamps |
| SM340150 | C - 150 ml | 96 clamps |
| SM340200 | C - 200 ml | 75 clamps |
| SM340250 | C - 250 ml | 65 clamps |
| SM340300 | C - 300 ml | 55 clamps |
| SM340500 | C - 500 ml | 42 clamps |
| SM341000 | C - 1000 ml | 24 clamps |
| SM341500 | C - 1500 ml | 18 clamps |
| SM342000 | C - 2000 ml | 15 clamps |
| SM343000 | C - 3000 ml | 11 clamps |
| SM344000 | C - 4000 ml | 8 clamps |
| SM345000 | C - 5000 ml | 6 clamps |
| SM346000 | C - 6000 ml | 6 clamps |



E-Universal tray: 420 × 420 mm

E-Universal tray, 420 × 420 mm, Capacity Erlenmeyer flasks:

| | |
|---------|-----------|
| 25 ml | 80 clamps |
| 50 ml | 49 clamps |
| 100 ml | 36 clamps |
| 125 ml | 26 clamps |
| 150 ml | 26 clamps |
| 200 ml | 24 clamps |
| 250 ml | 20 clamps |
| 300 ml | 18 clamps |
| 500 ml | 14 clamps |
| 1000 ml | 9 clamps |
| 1500 ml | 5 clamps |
| 2000 ml | 5 clamps |
| 3000 ml | 4 clamps |
| 4000 ml | 2 clamps |
| 5000 ml | 2 clamps |
| 6000 ml | 1 clamp |

EX-Universal tray: 500 × 420 mm

EX-Universal tray, 500 × 420 mm, Capacity Erlenmeyer flasks:

| | |
|---------|-----------|
| 25 ml | 90 clamps |
| 50 ml | 56 clamps |
| 100 ml | 45 clamps |
| 125 ml | 35 clamps |
| 150 ml | 35 clamps |
| 200 ml | 27 clamps |
| 250 ml | 24 clamps |
| 300 ml | 22 clamps |
| 500 ml | 16 clamps |
| 1000 ml | 10 clamps |
| 1500 ml | 6 clamps |
| 2000 ml | 5 clamps |
| 3000 ml | 5 clamps |
| 4000 ml | 3 clamps |
| 5000 ml | 2 clamps |
| 6000 ml | 2 clamps |



F-Universal tray: 800 × 420 mm

F-Universal tray, 800 × 420 mm, Capacity Erlenmeyer flasks:

| | |
|---------|------------|
| 25 ml | 113 clamps |
| 50 ml | 100 clamps |
| 100 ml | 72 clamps |
| 125 ml | 50 clamps |
| 150 ml | 50 clamps |
| 200 ml | 44 clamps |
| 250 ml | 40 clamps |
| 300 ml | 37 clamps |
| 500 ml | 27 clamps |
| 1000 ml | 16 clamps |
| 1500 ml | 12 clamps |
| 2000 ml | 9 clamps |
| 3000 ml | 8 clamps |
| 4000 ml | 5 clamps |
| 5000 ml | 4 clamps |
| 6000 ml | 4 clamps |

C-Universal tray: 800 × 660 mm

C-Universal tray, 800 × 660 mm, Capacity Erlenmeyer flasks:

| | |
|---------|------------|
| 25 ml | 175 clamps |
| 50 ml | 143 clamps |
| 100 ml | 88 clamps |
| 125 ml | 99 clamps |
| 150 ml | 96 clamps |
| 200 ml | 64 clamps |
| 250 ml | 58 clamps |
| 300 ml | 56 clamps |
| 500 ml | 42 clamps |
| 1000 ml | 20 clamps |
| 1500 ml | 16 clamps |
| 2000 ml | 12 clamps |
| 3000 ml | 11 clamps |
| 4000 ml | 8 clamps |
| 5000 ml | 6 clamps |
| 6000 ml | 6 clamps |

All the information on U-trays is without guarantee due to the variation in the flask size of different manufacturers!

Swiss Made
since 1949
a 5 year
warranty

Accessories for every application:

Trays to hold any kind of flasks, universal trays made of anodised aluminium with M4 threads or trays with fixed stainless steel clamps for Erlenmeyer flasks, or Fernbach flasks, test-tube holders, microtiter or deep well plates or any other kind of container.

Trays with a washable self sticking mat for shaking of Erlenmeyer flasks with speeds under 200 rpm. Trays with horizontal rubber covered bars or trays for separating vessels.

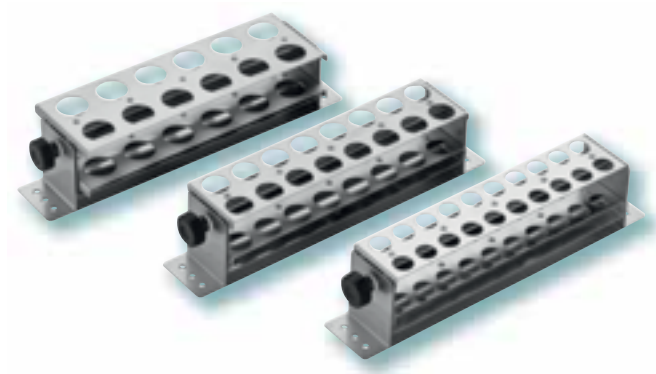
Clamps from 25 ml to 6000 ml or adjustable test-tube holders. Our specialty being custom-made shakers or accessories.

SWISS MADE SINCE 1949

Although Kühner Shakers are maintenance free, spare parts are stocked by our distributors, or can directly be shipped from our Swiss factory. All Kühner Shakers are entirely designed and manufactured in Switzerland.

A 5 year warranty





Universal trays made of anodised aluminium 4 mm thick with 4 mm threads:

| | |
|---------|-------------------------|
| SM3002 | EU tray (420 × 420 mm) |
| SMX3002 | EUX tray (500 × 420 mm) |
| SM3003 | FU tray (800 × 420 mm) |
| SM3004 | CU tray (800 × 660 mm) |

Clamps for Erlenmeyer flasks:

| | |
|----------|----------------|
| SM310025 | Clamp U - 25 |
| SM310050 | Clamp U - 50 |
| SM310100 | Clamp U - 100 |
| SM310125 | Clamp U - 125 |
| SM310150 | Clamp U - 150 |
| SM310200 | Clamp U - 200 |
| SM310250 | Clamp U - 250 |
| SM310300 | Clamp U - 300 |
| SM310400 | Clamp U - 400 |
| SM310500 | Clamp U - 500 |
| SM311000 | Clamp U - 1000 |
| SM311500 | Clamp U - 1500 |
| SM312000 | Clamp U - 2000 |
| SM313000 | Clamp U - 3000 |
| SM314000 | Clamp U - 4000 |
| SM315000 | Clamp U - 5000 |
| SM316000 | Clamp U - 6000 |

Test tube holders:

| | | |
|----------|------------|-------------------------|
| SM317016 | 16 mm dia. | 24 tubes (15 ml Falcon) |
| SM317018 | 18 mm dia. | 24 tubes |
| SM317020 | 20 mm dia. | 18 tubes |
| SM317025 | 25 mm dia. | 16 tubes |
| SM317028 | 28 mm dia. | 16 tubes (50 ml Falcon) |
| SM317030 | 30 mm dia. | 14 tubes |
| SM317032 | 32 mm dia. | 14 tubes |
| SM317034 | 34 mm dia. | 14 tubes |

Trays for microtiter or deep well plates:

| | | |
|-----------|---------|-----------------|
| SM3502.22 | E-MT.22 | 12 – 24 plates |
| SM3502.47 | E-MT.47 | 12 – 48 plates |
| SM3502.77 | E-MT.77 | 12 – 72 plates |
| SM3503.22 | F-MT.22 | 24 – 48 plates |
| SM3503.47 | F-MT.47 | 24 – 96 plates |
| SM3503.77 | F-MT.77 | 24 – 144 plates |
| SM3504.22 | C-MT.22 | 35 – 70 plates |
| SM3504.47 | C-MT.47 | 35 – 140 plates |
| SM3504.77 | C-MT.77 | 35 – 210 plates |

Trays with rubber mat:

| | |
|---------|-------------------------------|
| SM3602 | Tray with rubber mat size EG |
| SMX3602 | Tray with rubber mat size EXK |
| SM3603 | Tray with rubber mat size FG |

Trays with self sticking mat (black):

| | |
|----------|----------------------------------|
| SM3702 | E-tray with sticky mat EK |
| SMX3702 | EX-tray with sticky mat EXK |
| SM3703 | F-tray with sticky mat FK |
| SM3704 | C-tray with sticky mat CK |
| SM3714 | 1 pc sticky mat only, 20 × 20 cm |
| SM3714E | sticky mat only for E-tray |
| SM3714EX | sticky mat only for EX-tray |
| SM3714F | sticky mat only for F-tray |

Trays with rubber bars:

| | | |
|-----------|---------|----------------|
| SM4120.4 | EA-4QT | size E 4 bars |
| SMX4120.4 | EXA-4QT | size EX 4 bars |
| SM4130.6 | FA-6QT | size F 6 bars |

Trays for separating vessels:

| | | |
|-----------|-----------|---------------------|
| SM420250 | ES-250 | 5 vessels 250 ml |
| SM4202502 | ES-250/2 | 10 vessels 2 layers |
| SM420500 | ES-500 | 4 vessels 500 ml |
| SM4205002 | ES-500/2 | 8 vessels 2 layers |
| SM421000 | ES-1000 | 3 vessels 1000 ml |
| SM4210002 | ES-1000/2 | 6 vessels 2 layers |
| SM430250 | FS-250 | 10 vessels 250 ml |
| SM4302502 | FS-250/2 | 20 vessels 2 layers |
| SM430500 | FS-500 | 8 vessels 500 ml |
| SM4305002 | FS-500/2 | 16 vessels 2 layers |
| SM431000 | FS-1000 | 6 vessels 1000 ml |
| SM4310002 | FS-1000/2 | 12 vessels 2 layers |

Dual table for 2 levels of E, EX or F trays:

| | |
|----------|---------------------|
| SM851303 | Dual table (85 mm) |
| SM851304 | Dual table (120 mm) |

(LT-X up to 25 mm movement only)
(limited shaking speed)

Stationary tray/s for LT-X, ISF1-X, ISF4-X and Rack System, for storage of flasks etc.:

| | |
|---------|-------------|
| SMX1772 | LT-X |
| SMX1572 | ISF1-X |
| SM1672 | ISF4-X |
| SM1672 | Rack System |

Floor stand for ISF1-X and LT-X:

| | |
|---------|----------------------------|
| SM1560 | 400 mm high for 2 × ISF1-X |
| SM1561 | 765 mm high for 1 × ISF1-X |
| SMX1760 | 400 mm high for 2 × LT-X |
| SMX1761 | 765 mm high for 1 × LT-X |

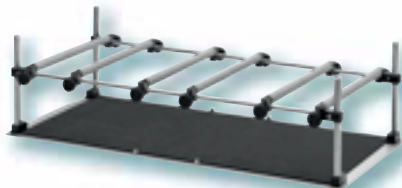
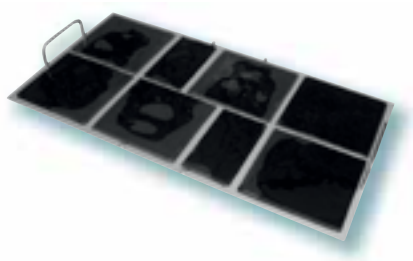
Pull-out platform for ease of loading and unloading of ISF1-X, ISF4-X or Rack System:

| | |
|--------|-------------------|
| SM1033 | pull-out platform |
|--------|-------------------|



Just tell us your requirements! Send us a drawing, or better still, send us a sample of the container that needs shaking and we will build the perfect holder.

Every kind of platform to shake strangely formed bottles with extruding rubber valves and plastic tubing connected to other containers have been manufactured and supplied to satisfied customers.



Shakers made to
customers specification
– our speciality

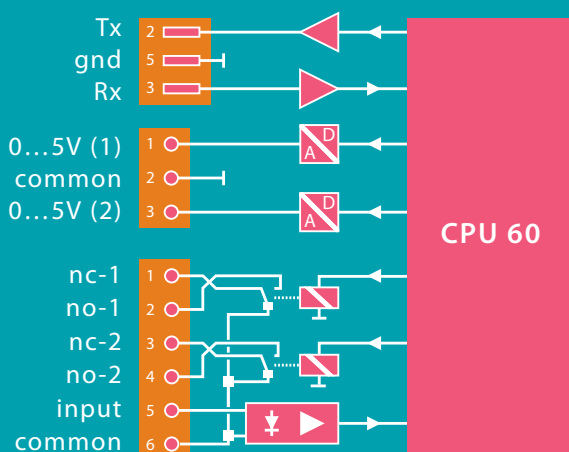
Working with ISIS-X Information System for Intelligent Shakers-ISIS:



ISO 9000-GMP-GLP

When working under these rules, continuous supervision, monitoring, audit trail etc. is required.

Via the necessary interface and the ISIS X software (option) all the influencing parameters, such as speed, temperature, controlled humidity and controlled CO₂, can be fully documented. Also for programming of experiments, calibration of speed, temperature, humidity and CO₂.



EMI-60 external machine interface:

1 RS-232 interface for the connection of one modem for external supervision.

2 analogue outputs with 0...5 volts.

2 relays with switch-over contacts and programmable function for the connection of a process supervision.

1 digital input for a 12...48 volt d.c. or a.c. signal with programmable function and galvanic separation



| | |
|-----------|---|
| SMX856000 | Software ISIS-X |
| SMX856010 | Interface: CAN-USB (PC) |
| SMX856020 | Interface: CAN-Ethernet (PC) |
| SMX856030 | EMI-60: External machine interface |
| SMX856040 | Universal converter 4–20 mA (in conjunction with EMI-60 only) |

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