



USTER® *HVI 1000*

The fiber classification and analysis system

Technical Data

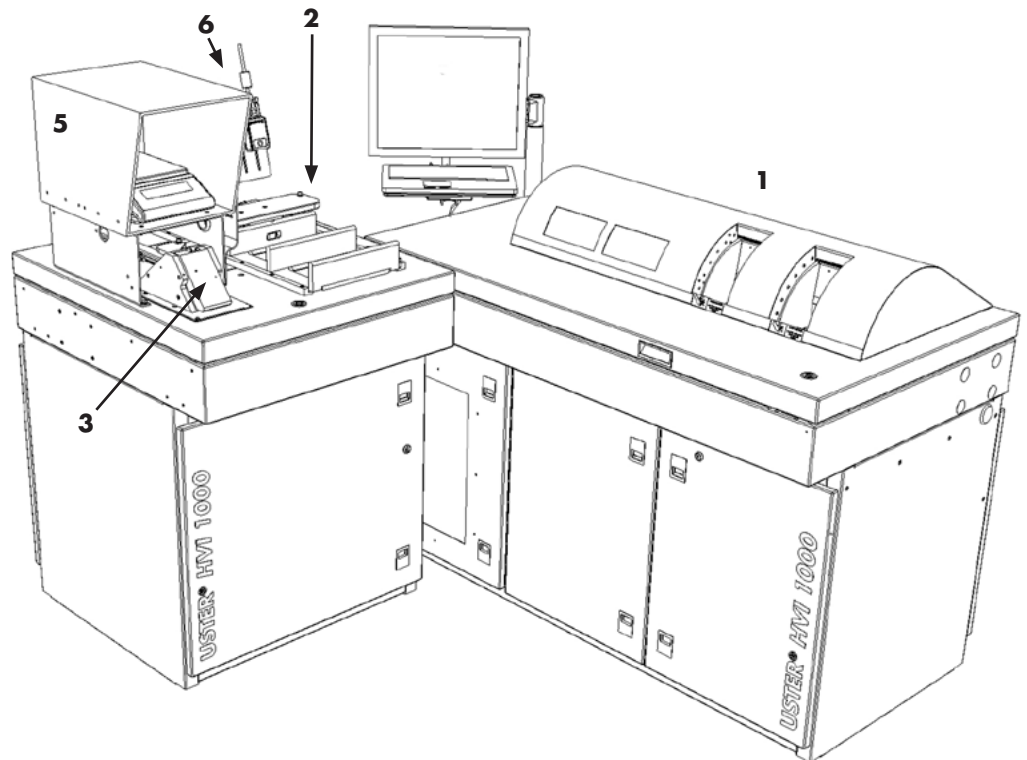
November 2017

USTER® HVI 1000

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The USTER® HVI 1000 measures the most important cotton fiber properties for cotton classing purposes, and high-throughput requirements for spinning mills. These are length, uniformity, short fiber index, micronaire, maturity index, strength, elongation, color and trash, and moisture content.

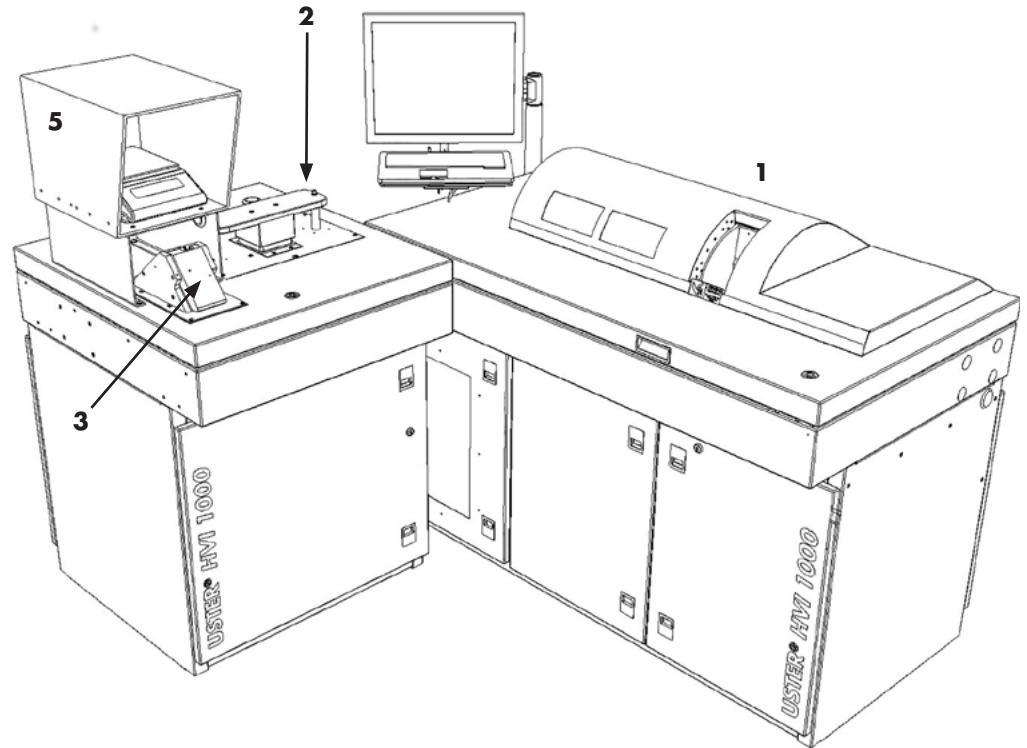
Elements of the USTER® HVI 1000 M1000 installation



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Elements of the USTER® HVI 1000 M700 installation



Basic installation

- 1 Length/Strength Module
- 2 Color Trash Module
- 3 Micronaire Module
- 4 Printer & printer table
- 5 Balance
- 6 Bar Code Reader (optional for USTER® HVI 1000 M700)
- 7 Length/strength cabinet
- 8 Micronaire, color and trash cabinet
- 9 Operating unit

Optional Modules

- Bar Code Reader (USTER® HVI 1000 M700)
- NEP Module

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Basic installation

Overall installation	Functions:	<ul style="list-style-type: none">– Measurement of raw cotton bale fiber properties of length, strength, fineness, color and moisture– Collection, evaluation and storage of measurement data– System testing and module testing mode– Editor for configuring, viewing, and printing module and bale data– BALE MANAGER software for bale management of incoming raw materials and laydowns (Optional)
	Versions:	<ul style="list-style-type: none">– USTER® HVI 1000 M1000 – 2 LS samplers– USTER® HVI 1000 M700 – 1 LS sampler
	Included in the delivery:	<ul style="list-style-type: none">– Operating units consisting of:<ul style="list-style-type: none">– Length/Strength Module– Color Trash Module– Micronaire Module– Printer & printer table– Balance– Bar Code Reader (Optional for USTER® HVI 1000 M700)– Length/strength cabinet– Micronaire, color and trash cabinet– Application software– Spare parts kit (Optional)– Calibration materials
Length/Strength Module (1)	Functions:	<ul style="list-style-type: none">– Measurement of fiber mean length, upper half mean length, uniformity, short fiber by way of optical measurement– Measurement of fiber strength by way measuring force required to break– Measurement of fiber elongation by way of measuring the length or distance to which fibers extend before breaking– Measurement of moisture in fiber beard by way of a resistance method
Color Trash Module (2)	Functions:	<ul style="list-style-type: none">– Measurement of fiber color by way of optical camera to determine the lightness (Rd) and yellowness (+b)– Color grade calculated from these values and reported– Measurement of trash by automated video image to determine visible leaf or trash in cotton reporting trash area, trash count, leaf grade

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Micronaire Module (3)	Functions:	<ul style="list-style-type: none"> – Measurement of the air flow resistance to a specific surface of fiber to determine the micronaire value
Printer (4)	Minimal configuration:	<ul style="list-style-type: none"> – Windows 7 compliant – Some charts may require color printing for clarity of the information presented – USB connection for local printing – Ethernet connected printers are acceptable, but may require customer provided hardware and installation expertise
Balance (5)	Functions:	<ul style="list-style-type: none"> – Used for weighing the sample for the Micronaire Module
Bar Code Reader (6)	Functions:	<ul style="list-style-type: none"> – Used for scanning the bar code identification, when available, from bale tags which is used as bale identification in the data summary by the software as well as printed reports
Length/strength cabinet (7)	Functions:	<ul style="list-style-type: none"> – Houses all the module components of the Length/Strength Module – Houses the vacuum box and motor as well as the host computer
Micronaire, color and trash cabinet (8)	Functions:	<ul style="list-style-type: none"> – Houses the Micronaire Module and Color/Trash Module – Houses the balance and Bar Code Reader
Operating unit (9)	Main Equipment:	Length/strength cabinet, micronaire and color/trash cabinet
	Computer software:	<p>The USTER® HVI 1000 software has a menu driven design that allows quick access and selection of testing, setup, calibration, and data management. These features include:</p> <ul style="list-style-type: none"> – Windows 7 operating system with icon-based software – Simple user interface – Error messages for troubleshooting – Network capabilities
	Computer hardware:	<p>Industrial computer system consisting of the following components:</p> <ul style="list-style-type: none"> – Keyboard with integrated touchpad – Monitor – Balance – Printer – Integrated bar code scanner

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Optional Modules

Bar Code Reader (M700)

Functions:

- Used for scanning the bar code identification, when available, from bale tags which is used as bale identification in the data summary by the software as well as printed reports

NEP Module

Functions:

- Measurement of nep count (Neps/gram) by way of individualizing the neps and counting them electro-optically

Calibration materials

Standard calibration materials

- One set of calibration materials is included with each instrument shipment
- Calibration materials are provided by United States Department of Agriculture (USDA) for HVI® and include:
 - Color and Trash tile set for calibrating the color and trash module
 - Short/weak, long/strong, Pima cottons for calibrating the length and strength module
 - High and low micronaire cotton for calibrating the Micronaire Module

Additional features

- Safety interlocks to prevent injury from un-authorized entry to the instrument
- Relative humidity and temperature probe
- Moisture measurement
- Easily accessible lint waste box with two separate access doors
- Computer system easily removed for service
- Configuration can be straight line configuration or 'L' configuration
- Industrial brushed stainless steel top and work surfaces
- Integrated air enclosure around balance to eliminate influences of air turbulence
- Password protected operational software
- Complete operator manual included

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Application software

Reports

Type of reports:

- Individual and summary report
- Histograms
- Fibrogram curve
- Stress/strain curve
- Color chart
- Calibration report

Display and print-out of the reports:

- Automatic reports
- Configurable reports

Limit values:

- Lot Limits for the maximum and minimum allowed values for a specified measured parameter
- Side Limits for defining the maximum difference between successive tests for a specified measured parameter

Numerical output of results

Micronaire:

Quality characteristic which is proportional to the fiber fineness

Maturity index:

Calculated index of the maturity

Upper half mean length:

Fiber length which is equivalent to the classer's staple

Uniformity index:

Quality characteristic which is proportional to the variation of the fiber length

Short fiber:

Measurement of short fibers <0.5 in/12.7 mm

Strength:

Fiber strength, measured at the fiber bundle

Elongation:

Fiber elongation, measured at the fiber bundle

Moisture:

Moisture content of the fiber, measured at the fiber bundle

Reflectance:

Whiteness/grayness of the cotton sample

Yellowness:

Yellowness of the cotton sample

Trash:

Trash content of a measured sample

Spinning consistency index:

Calculated index of the spinnability of measured sample

Statistics

Statistical values:

- Overall measurement protocol with statistical data of the result columns
- Mean (Average)
 - Standard deviation
 - Coefficient of variation CV %
 - 99 % confidence range
 - Min. value
 - Max. value

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Data protection	Backup:	<ul style="list-style-type: none">– A 2nd hard disk (with identical storage capacity) is available for data and image backup purposes.– Backup software is provided for the user to create a backup image of the primary hard disk.
Input of data, output of results, languages, units	Dialog and report languages:	English, Chinese, Spanish, Turkish, French, Portuguese, Russian can be selected via the operating menu (other languages on request).
	Possible units:	<ul style="list-style-type: none">– Length: mm, in– Short Fiber: 0.5 in, 12.7 mm, 16 mm– Moisture: dry basis, wet basis
	Test time:	25 seconds up to 1 minute, variable depending on operator experience.
Selftest	Function check:	Comprehensive function check and special test programs can be initiated at any time via the diagnosis menu.

Application range

Bar Code Reader (M700)	Functions:	Used for scanning the bar code identification, when available, from bale tags which is used as bale identification in the data summary by the software as well as printed reports
NEP Module	Functions:	Measurement of nep count (Neps/gram) by way of individualizing the neps and counting them electro-optically

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Calibration materials

Naturally (white, cream) colored 100% cotton samples in the form of bale or opened and cleaned material (card mat).

Measurements

- Micronaire
- Maturity Index
- UHML – Upper Half Mean Length
- UI – Uniformity Index
- SF – Short Fiber
- Fiber Strength in g/Tex
- Elongation
- Moisture content
- Color (Reflectance Rd, Yellowness +b) & color grade based on USDA color charts for Upland or Pima cottons, or regionally customized color chart (provided on demand)
- Trash (% area, trash count) & trash grade based on USDA trash standards
- SCI – Spinning Consistency Index

Measurements and calculations

Micronaire:	Micronaire reading Measured by relating airflow resistance to the specific surface of fibers
Maturity:	Maturity Ratio Calculated using a sophisticated algorithm based on several HVI™ measurements.
Length:	Upper Half Mean Length, Uniformity Index, Short Fiber Index Measured optically in a tapered fiber beard which is automatically prepared, carded, and brushed.
Strength:	Strength, elongation Strength is measured physically by clamping a fiber bundle between 2 pairs of clamps at known distance. The second pair of clamps pulls away from the first pair at a constant speed until the fiber bundle breaks. The distance it travels, extending the fiber bundle before breakage, is reported as elongation.
Moisture:	Moisture content Moisture content of the cotton sample at the time of testing, using conductive moisture probe.
Color:	Rd (Whiteness), +b (Yellowness), color grade Measured optically by different color filters, converted to USDA Upland or Pima color grades or regional customized color chart.

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Trash:	Particle count, % surface area covered by trash, trash code measured optically by utilizing a digital camera, and converted to USDA trash grades or customized regional trash standards.
Spinning Consistency Index:	SCI Calculation for predicting the spinnability of the fibers

General

General ambient conditions

Room climate:	According to ISO 139, the following ambient conditions must be maintained in the laboratory in order to get repeatable and comparable test results: <ul style="list-style-type: none">– Temperature: $20\pm 2^{\circ}\text{C}$; 65°F to 72°F– Relative humidity: $65\pm 2\%$
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For consistent test results, fiber samples should be conditioned in the laboratory environment with the above-mentioned ambient conditions for 24 hours. Samples should be laid out openly in the laboratory, and taken out of plastic bags, in order for the cotton to fully condition to the environment.

Uster Technologies recommends use of a dedicated conditioning system for the laboratory to achieve this condition. USTER does not recommend the use of any spray atomizers as they could result in damage to the instruments, variability in lab conditioning, and may cause inconsistent test results. All USTER certified laboratories use dedicated conditioning systems.

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Installation data

Power:

The following power requirements apply to both North American and European-type systems.

Voltage (nominal):	220 AC ±15 %
Current:	<15 Amperes
Frequency:	50 – 60 Hertz
Harmonic distortion:	<5 %
Wire size:	Sufficient to have <5 % drop from no load to full load
Electrical interference:	Free of transient voltages from other equipment

The USTER® HVI 1000 system operates on 220V AC ±15 % (50 to 60 Hz) and requires a separate dedicated 15-amp circuit breaker at the facility's electrical load center. During normal operation, the USTER® HVI 1000 system draws approximately eight (8) amps; the startup current is sufficiently high to require a larger breaker. A power cord is provided that will connect to the USTER® HVI 1000 system. The opposite end must be fitted with connections compatible with the facility's electrical system.

UPS requirements:

If frequent power shutdowns or fluctuations are expected, Uster Technologies recommends that an Uninterruptible Power Supply (UPS) be used to prevent loss of data or other related problems. A partial system UPS is an available option, (#255-010-18560 KIT, HVI 1000 UPS OPTION). The following specifications should be noted:

Partial system support (without the vacuum blower)

Protects computer system, motors, and power supplies, but not the blower:

- If UPS is purchased locally, we recommend APC Model BR1200, or equivalent with the following characteristics:
 - o "Line Interactive" or "AVR" (automatic voltage regulation) for maximum protection against line transients – under voltages (brownouts) and over voltages (spikes).
- Minimum output power rating of 1200 VA – 780 Watts at 120 Volts 50 – 60 Hz.
- Must be TÜV certified or bear the CE mark for European countries and be UL listed for North America.
- Run time of 10 minutes or greater.

Entire system support (with vacuum blower)

Uster Technologies does not offer the option to purchase a UPS to protect the entire USTER® HVI 1000 system.

It is recommended that entire system UPS units be purchased locally. We recommend Superior Electric #SLI3000XR for European and North American power systems or their equivalent. The UPS should also meet the above listed requirements.

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Compressed air

The air supplied to the instrument should comply with ISO 8573. 1 quality class 3 as follows:

Dirt particle size:	<5 microns
Water pressure dew point:	<4° F @ 100 PSIG (128 ppm by volume)
Oil (including vapor):	<1.0 ppm
Air pressure:	100–150 PSIG (700–1034 kPa)
Air volume:	The instrument requires at least three SCFM (85 liters/min) supplied by a 10 mm (3/8 inch) line
Laboratory temperature:	These specifications are for the ambient conditions referenced above. If the airline will be subjected to temperatures that could promote condensation, a water filter attached to the airline inside the lab is recommended to remove any condensation that may occur.

Space required for the installation of the USTER® HVI 1000

The USTER® HVI 1000 can be installed in an In-Line (straight) or an L-shaped configuration and requires only one operator. The following is a breakdown of the individual cabinets for each instrument.

Dimensions

	Length	Width	Height from floor
Length/strength cabinet	134.9 cm	75.4 cm	96.5 cm
Micronaire, color and trash cabinet	70.4 cm	75.4 cm	96.5 cm

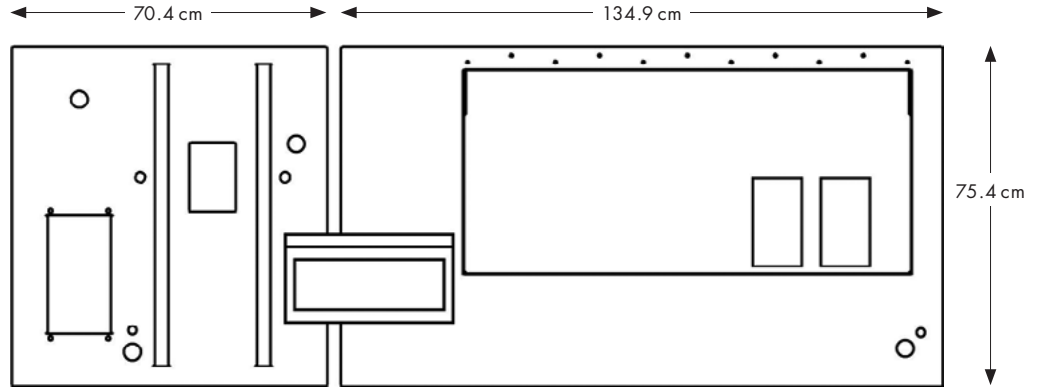
Gross weight of the basic installation

	M1000	M700
Length/strength cabinet	765 pounds/347 kg	725 pounds/329 kg
Micronaire, color and trash cabinet	335 pounds/152 kg	335 pounds/152 kg
Total	1 100 pounds/499 kg	1 060 pounds/481 kg

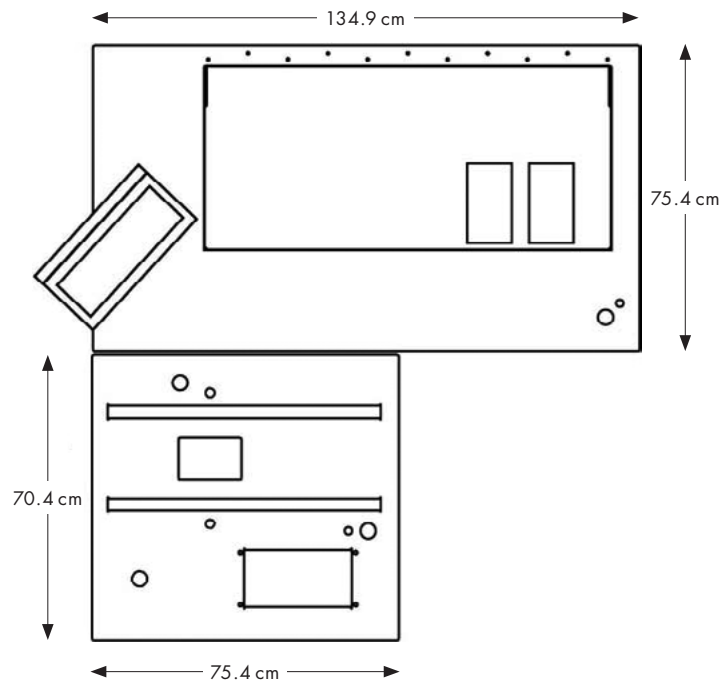
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M 1000 In-line



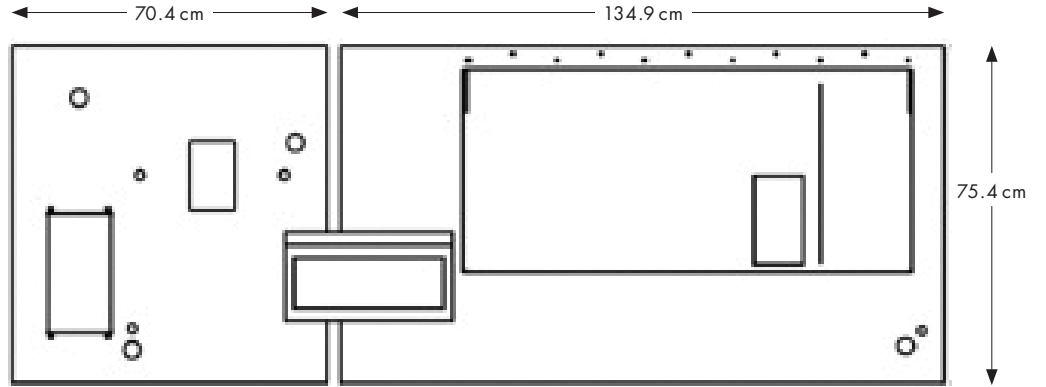
M 1000 L-shaped



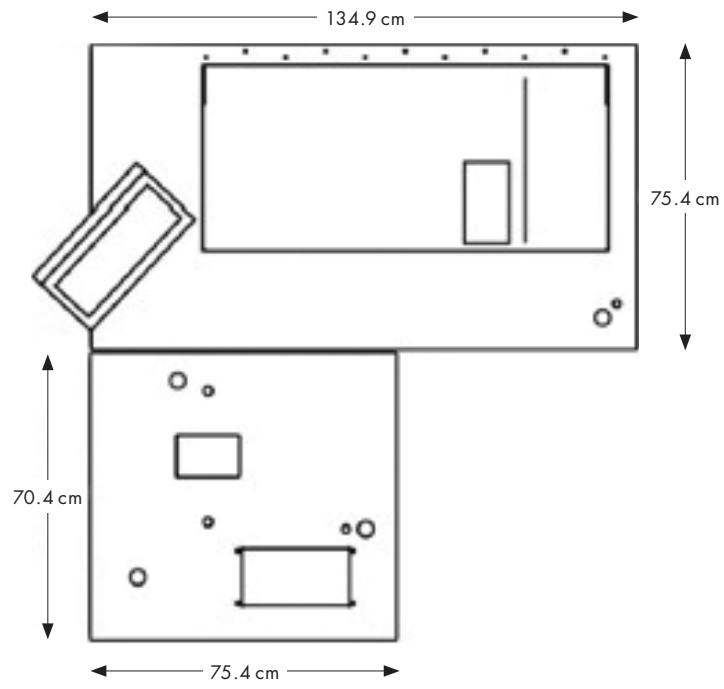
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M 700 In-line



M 700 L-shaped



Uster Technologies has made all possible efforts to ensure that all information is accurate at the time of publication. Hereby it is declared that alterations to the product may be possible at any time. In these cases the information contained in this technical datasheet is subject to change without notice.

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Uster Technologies AG

Sonnenbergstrasse 10

8610 Uster

Switzerland

T. +41 43 366 36 36

F. +41 43 366 36 37

sales@uster.com

www.uster.com