



USTER® *HVI 1000*

The fiber classification and analysis system

Technical Data

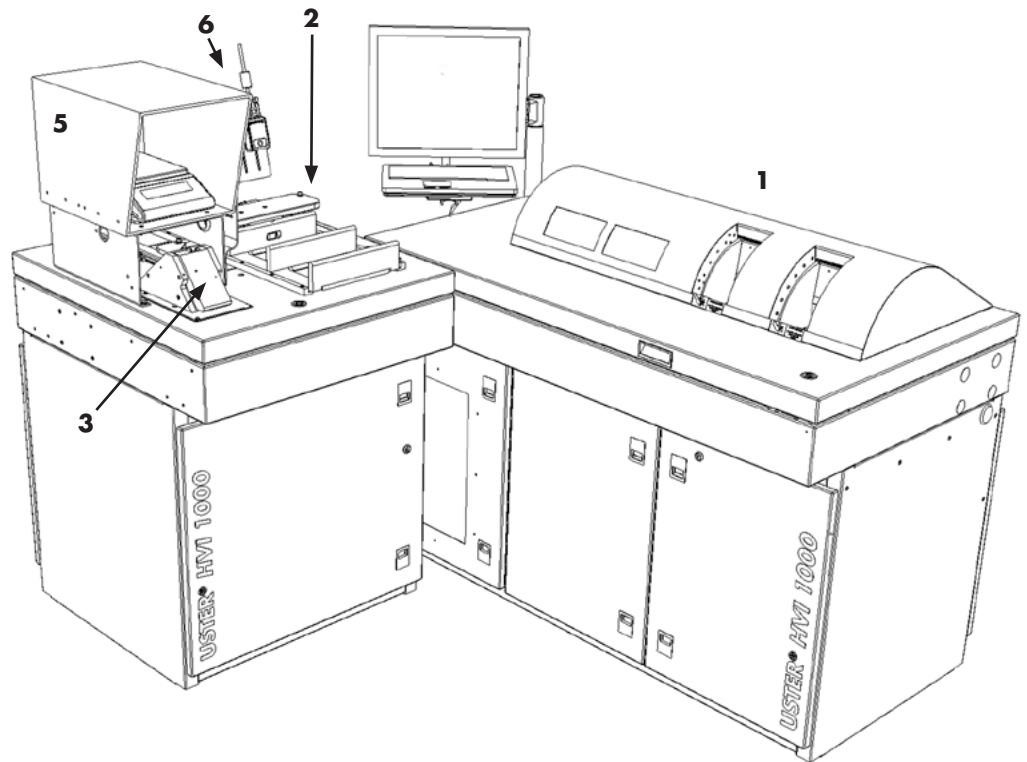
March 2020

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.

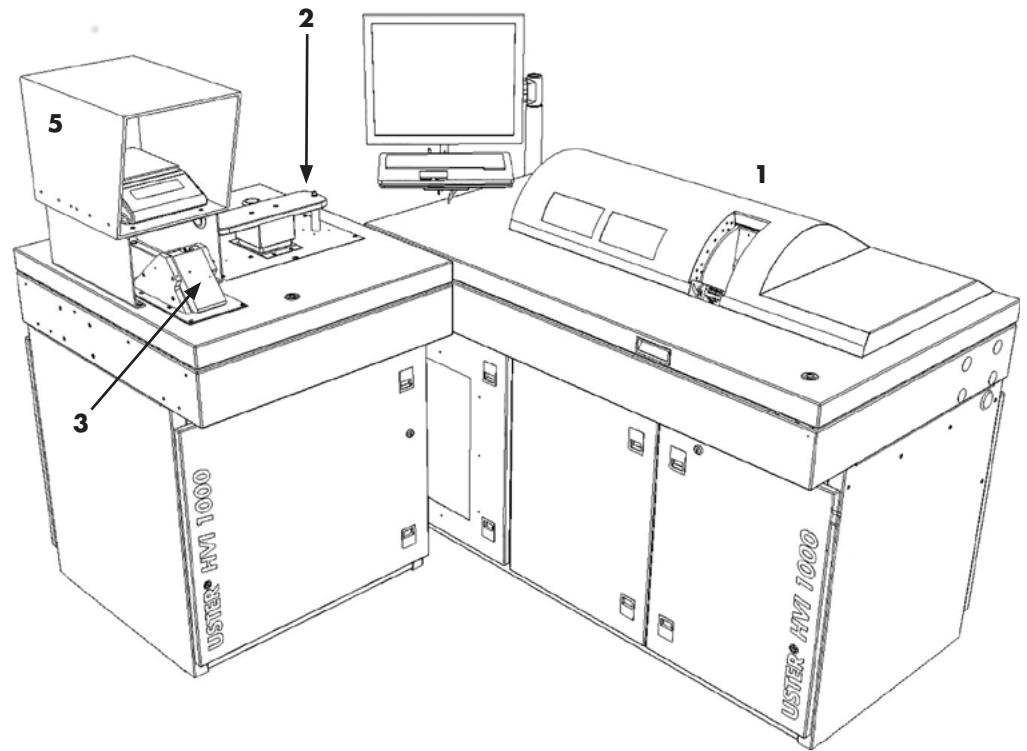
Elements of the USTER® HVI 1000 M1000 installation



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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 10 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 10 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	<ul style="list-style-type: none"> – Individual and summary report – Histograms – Fibrogram curve – Stress/strain curve – Color chart – Calibration report 	
	Display and print-out of the reports	<ul style="list-style-type: none"> – Automatic reports – Configurable reports 	
	Limit values	<ul style="list-style-type: none"> – 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	<p>Overall measurement protocol with statistical data of the result columns</p> <ul style="list-style-type: none"> – Mean (Average) – Standard deviation – Coefficient of variation CV % – 99 % confidence range – Min. value – Max. value 	

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Data protection

Backup

- 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

- 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.

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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

Main Testing System 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.

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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.
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

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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:

- Temperature: 20 ± 2 °C; 65 °F to 72 °F
- Relative humidity: 65 ± 2 %

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.

Installation data

Power

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

Voltage (nominal): 220 VAC ± 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 220 VAC ± 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.

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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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Uninterrupted power supply (UPS) specifications and recommendations

Uster Technologies requires that an Uninterruptible Power Supply (UPS) be used to prevent loss of data or other related problems. It is a requirement for the installation and commissioning of the unit and the responsibility of the customer to provide it at the time of installation. The following specifications should be noted:

FULL System UPS

Highly recommended and even required in many countries where quality of AC power issues is common. Specifications:

Input

Voltage 208 – 240 VAC

Frequency 50/60 Hz

Output

Topology Double Conversion

Mode of operation Online

Power Capacity 3.0 KVA

Waveform Type Sine wave

Nominal Output Voltage 208 – 240 VAC

Voltage regulation +/-2 %

Frequency Synchronized to input

Surge Protection/Filtering

AC Surge Protection Greater than 300 joules

Filtering Preferred

Examples of approved UPS manufacturer models:

MFG	Part	Rating	Capacity (min)
APC	SRT3000XLT+SRT96BP(1X)	3 000 VA	15
APC	SRT3000XLT+SRT96BP(2X)	3 000 VA	30
APC	SRT3000XLT+SRT96BP(3X)	3 000 VA	60
CyberPower	OL3000RTL2UHVN	3 000 VA	5
Tripplite	SU3000LCD2UHV	3 000 VA	5

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Partial System UPS (Not recommended – PC data protection only, Blower is not protected)
Specifications:

Input

Voltage	120 V
Frequency	50/60 Hz

Output

Topology	Double Conversion
Mode of operation	Online
Power Capacity	1.5 KVA
Waveform Type	Sine wave
Nominal Output Voltage	120 V
Voltage regulation	+/-2 %
Frequency	Synchronized to input

Surge Protection/Filtering

AC Surge Protection	Greater than 300 joules
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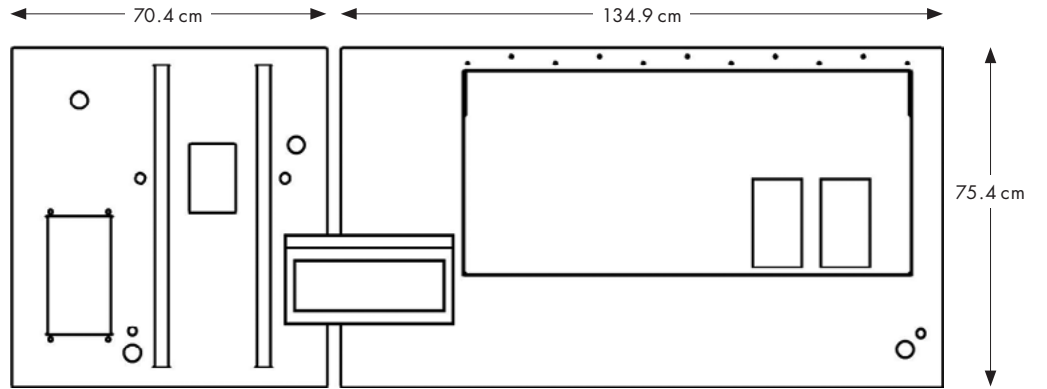
Examples of approved UPS manufacturer models:

MFG	Part	Rating	Output Capacity
TrippLite	SU1500XL	1.5 KVA	1200 W
APC	SRT1500	1.5 KVA	1350 W
CyberPower	OL1500RTXL2U	1.5 KVA	1350 W

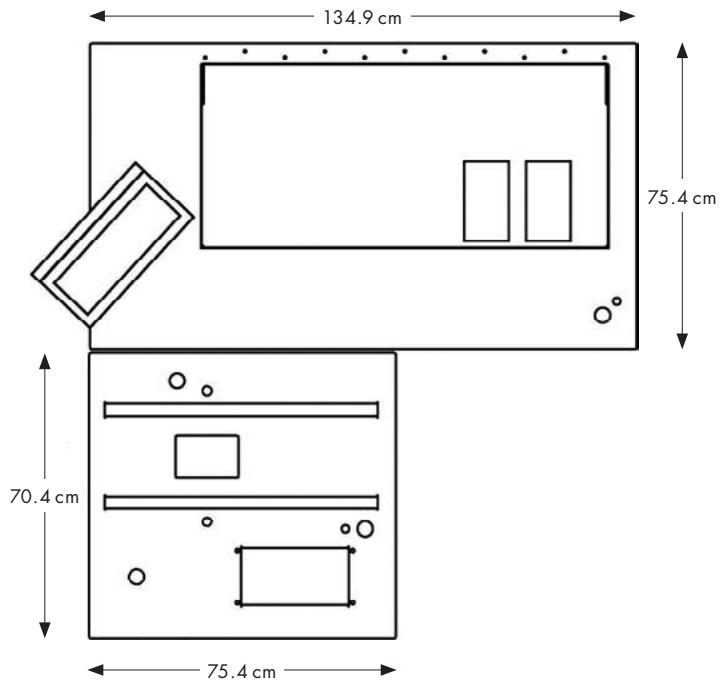
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M 1000 In-line



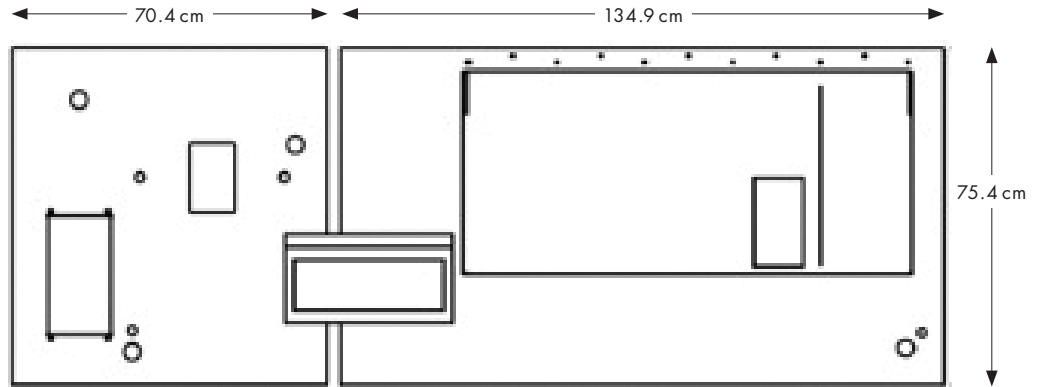
M 1000 L-shaped



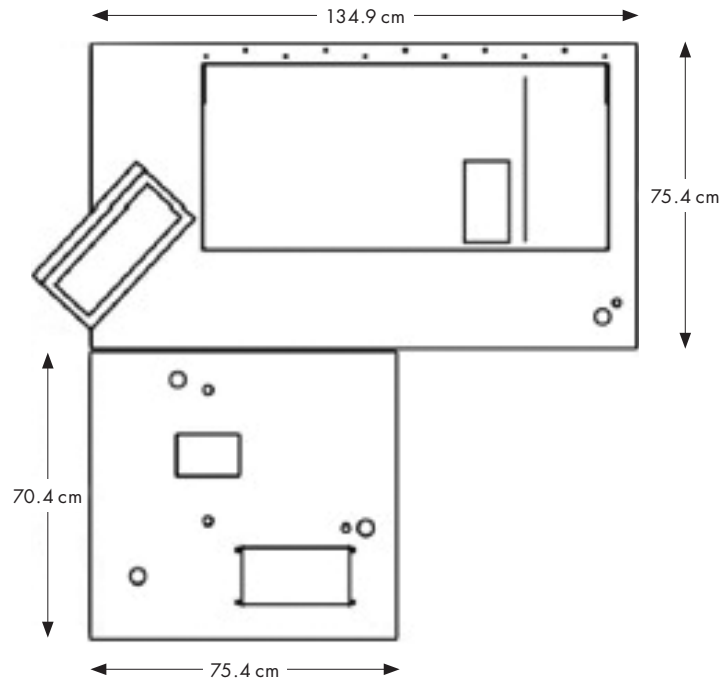
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M 700 In-line



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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