



# USTER® *TESTER 5-M*

The yarn analysis system

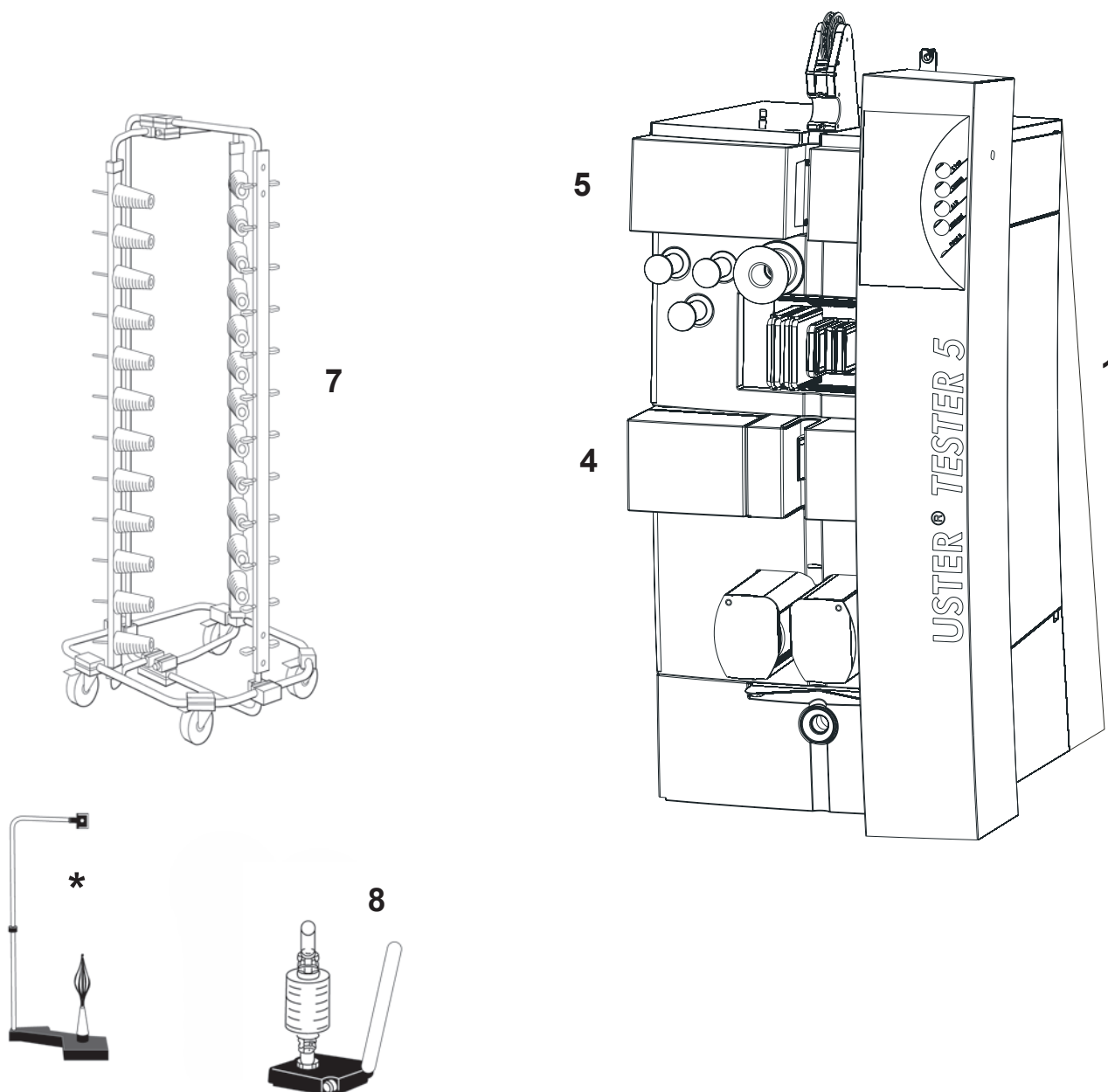
Technical Data

February 2014

## THE YARN INSPECTION SYSTEM

The digital testing and analyzing installation for the quality assurance of yarn, roving and sliver of staple fibers

Elements of the USTER® *TESTER 5-M* installation



# THE YARN INSPECTION SYSTEM

## Basic Installation

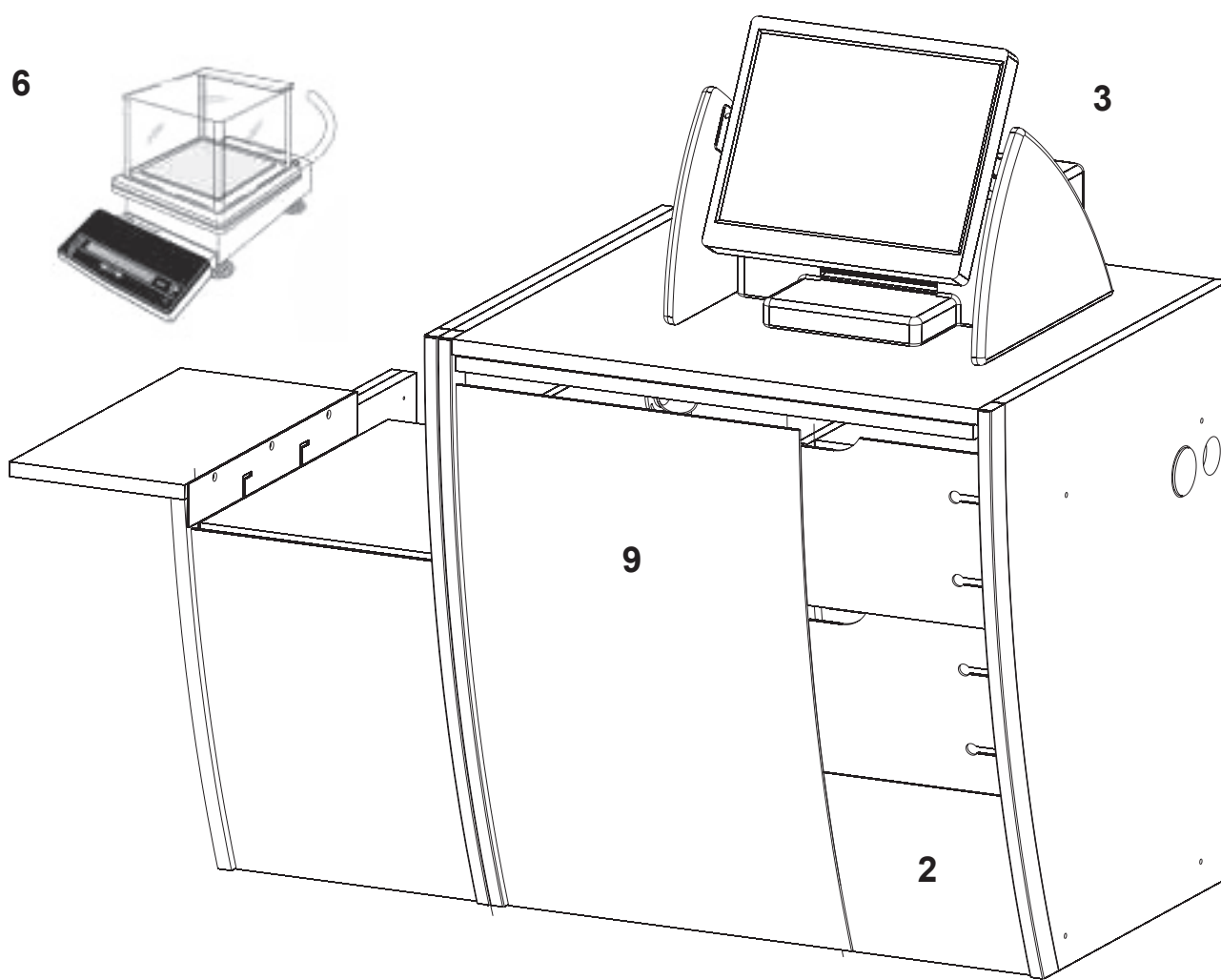
- 1 Test Unit
  - Sensor CS, Evenness Unit
  - Knowledge Based System
- 2 Operating Unit
- 3 System Printer
- \* Single-package creel

## Options

- 4 Sensor MS120 integrated as well as external
- 5 Additional measuring units
  - Sensor OH, Hairiness measuring unit
- 6 Sensor FSA, Count Manual  
Fancy Yarn Profile (no illustr.)

## Special Accessories

- 7 Packages Carrier 24/40
- 8 Unwinding Device, manual
- 9 Table Set



## Basic Installation

|                             |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overall Installation</b> | <i>Functions:</i>                | <ul style="list-style-type: none"><li>• Capacitive measurement of mass variations and imperfections in yarn, roving and sliver of staple fibers.</li><li>• Collection, evaluation and storage of measurement values.</li><li>• Automatic check of all measured values, diagrams and spectrograms.</li><li>• Yarn classification based on the USTER® <i>STATISTICS</i>.</li><li>• Editor for customizing report layouts.</li><li>• Filter functions for quick data retrieval and for the preparation of long-term reports.</li><li>• Simulation of yarn boards, woven and knitted fabrics.</li><li>• QualiProfile, graphic presentation of the overall quality.</li></ul> |
|                             | <i>Version:</i>                  | USTER® <i>TESTER 5-M</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                             | <i>Included in the delivery:</i> | <ul style="list-style-type: none"><li>• Test Unit</li><li>• Operating Unit (Control Unit, screen, keyboard and mouse, backup unit)</li><li>• System Printer</li><li>• Single-package Carrier</li><li>• Application Software</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|                      |                                                                  |                                                                                                                                                                                                                                                                             |
|----------------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TEST UNIT (1)</b> | <b>Subsystems of the USTER® <i>TESTER 5-M</i> basic version:</b> |                                                                                                                                                                                                                                                                             |
|                      | <i>Sensor CS:</i>                                                | <ul style="list-style-type: none"><li>• Capacitive measurement of mass variations and imperfections in yarn, roving and sliver of staple fibers.</li><li>• Measurement range: approx. 1 tex to 12 ktex (limitations according to the type of fiber are possible).</li></ul> |
|                      | <i>Conveyor S:</i>                                               | <ul style="list-style-type: none"><li>• Material conveying system for yarn, roving and sliver.</li><li>• Testing speed: 25 to 400 m/min.</li></ul>                                                                                                                          |
|                      | <i>BASE S:</i>                                                   | Absorber for the removal of the tested yarn.                                                                                                                                                                                                                                |
|                      | <i>Keypad:</i>                                                   | Control keys for easy operation.                                                                                                                                                                                                                                            |

|                                    |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>KBS, Knowledge-based System</b> | <i>Function:</i> | Knowledge-based software module for detecting the cause of periodic faults in the spectrogram: <ul style="list-style-type: none"><li>• the parts of the respective production machine which may be defective are marked in the graphic representation,</li><li>• the gearing layouts of the most important production machines are stored,</li><li>• software-supported configuration of the gearing layouts and the knowledge base.</li></ul> |
|------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## THE YARN INSPECTION SYSTEM

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### Operating Unit (2)

#### *Computer software:*

The USTER® *TESTER 5-M* is a menu driven design that allows quick access and selection of testing, setup, calibration and data management. These features include:

- Windows operating system with icon-based software
- Simple user interface
- Error messages for troubleshooting
- Network capabilities

#### *Computer hardware:*

- Industrial computer system with dual core 2.5 GHz processor and 4GB RAM
- DVD-R drive
- 2 hard drive, 250 GB or better

#### *Computer accessories:*

- 19" high resolution flat panel LCD monitor with integrated sound bar
- Laser printer
- Keyboard
- Optical mouse

## Options

|                                            |                                                       |                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sensor MS120 (4)</b>                    | <i>Application range:</i>                             | Additional measuring unit for measuring heavy sliver, wool tops and converter tops in the range of approx. 12 to 80 ktex (limitations according to the type of fiber are possible).                                                                                                                                                                                         |
| <b>Additional Measuring Units (5)</b>      | <b>Optical measuring units</b><br><i>Application:</i> | <ul style="list-style-type: none"><li>• Determination of additional yarn parameters (simultaneous with the determination of mass variation).</li><li>• Subsystem of the USTER® <i>TESTER 5</i>, can be extended according to your needs.</li><li>• See also the sales presenter of the USTER® <i>TESTER 5</i>.</li></ul>                                                    |
| <b>Sensor OH, Hairiness Measuring Unit</b> | <i>Application range:</i>                             | Determination of the hairiness of staple fiber yarn in the range of approx. 5 to approx. 1000 tex (limitations according to the type of fiber are possible).                                                                                                                                                                                                                |
| <b>Sensor FSA, Count Manual (6)</b>        | <i>Application range:</i>                             | Manual determination of the absolute count of yarn, roving and sliver of staple fibers in the count range of 1 tex to 50 ktex.                                                                                                                                                                                                                                              |
| <b>Fancy Yarn Profile</b>                  | <i>Function:</i>                                      | <ul style="list-style-type: none"><li>• Capacitive measurement of slub yarn with a testing speed of 400 m/min.</li><li>• Determination of slub length, mass increase, slub distance.</li><li>• Additional parameters available.</li><li>• Graphical output: mass diagram, scatter plot, slub sequence diagram, histogram, 3D histogram, spectrogram slub removed.</li></ul> |
| <b>Connection to LAB EXPERT</b>            | <i>Function:</i>                                      | Connection set to connect the USTER® <i>TESTER 5</i> to the USTER® <i>LAB EXPERT</i> .                                                                                                                                                                                                                                                                                      |

## Special Accessories

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### **Packages Carrier 24/40 (7)**

*Application:*

Packages carrier for creeling and transporting up to 40 bobbins.

*Package dimensions:*

- With 24 packages: Ø max. 125 mm; length max. 450 mm
- With 40 packages: Ø max. 60 mm; length max. 450 mm

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### **Unwinding Device, manual (8)**

*Application range:*

Unwinding of roving and rubbings.

*Take-up speed:*

- Max. 50 m/min, according to the symmetry of the package.
- Manual adjustment of tension.

*Package dimensions:*

Ø max. 600 mm; inside Ø min. 20 mm; length max. 500 mm.

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### **Table Set (9)**

*Application range:*

- Tester table for the USTER® *TESTER 5-M*.
- Main table for keyboard, printer, screen, including waste box.

## Application Software

|                                                |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Reports</b>                                 | <i>Type of reports:</i>                      | <ul style="list-style-type: none"> <li>• Test reports of measurement series.</li> <li>• USTER® Quality Report (summary of the key data and the test results on one page; quality certificate).</li> <li>• USTER® <i>QualiProfile</i>™ (graphic presentation of the overall yarn quality, with respect to the USTER® <i>STATISTICS</i> or to a customer-specific yarn profile).</li> <li>• Long-term reports.</li> <li>• Pre-configured standard reports for different applications.</li> <li>• Customized reports.</li> </ul> |
|                                                | <i>Display and print-out of the reports:</i> | <ul style="list-style-type: none"> <li>• Automatic reports.</li> <li>• Exception reports.</li> <li>• As required.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                | <i>Limit values:</i>                         | <ul style="list-style-type: none"> <li>• Determination of fixed limits or definition of limits based on the USTER® <i>STATISTICS</i> stored in the system.</li> <li>• Verification of measured values.</li> <li>• Measured values which exceed the set limits will be marked.</li> </ul>                                                                                                                                                                                                                                      |
| <b>Numerical Output of Results (SENSOR CS)</b> | <i>Unevenness U:</i>                         | Determination of the mass unevenness by help of the irregularity.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                | <i>Coefficient of variation CV:</i>          | Determination of the mass unevenness by help of the coefficient of variation.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                | <i>Coefficient of variation CV(L):</i>       | Determination of the unevenness for cut lengths of 1, 3, 10, 50 or 100 m.                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                | <i>Deviation rate DR%:</i>                   | 4 channels with separately selectable ranges and integration lengths: DR, DR+, DR-, DRt                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                | <i>Maximum mass variation:</i>               | <ul style="list-style-type: none"> <li>• m (max) = maximum mass increase</li> <li>• m (min) = maximum mass reduction</li> <li>• Possible cut lengths for the calculation: 1, 3, 10, 50 or 100 m</li> </ul>                                                                                                                                                                                                                                                                                                                    |
|                                                | <i>Index I of irregularity:</i>              | Relationship between the ideal and the actually measured unevenness of staple fiber material.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                | <i>Imperfections:</i>                        | Counting of thin places, thick places and neps with selectable sensitivity limits: <ul style="list-style-type: none"> <li>• Thin places: -30%; -40%; -50%; -60%</li> <li>• Thick places: +35%; +50%; +70%; +100%</li> <li>• Neps: +140%; +200%; +280%; +400%</li> </ul>                                                                                                                                                                                                                                                       |
|                                                | <i>Relative count:</i>                       | Percentage count variation of the test material between single tests in a sample, with reference to a selectable material length.                                                                                                                                                                                                                                                                                                                                                                                             |

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### Numerical Output of Results (SENSOR OH)

|                                     |                                                                                                                                                                                                           |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Hairiness H:</i>                 | Determination of the hairiness.                                                                                                                                                                           |
| <i>Standard deviation sh:</i>       | Standard deviation of hairiness.                                                                                                                                                                          |
| <i>Standard deviation sh(L):</i>    | Standard deviation of hairiness for cut lengths of 1, 3, 10, 50 or 100 m.                                                                                                                                 |
| <i>Maximum hairiness deviation:</i> | <ul style="list-style-type: none"> <li>• h (max) = maximum hairiness increase</li> <li>• h (min) = maximum hairiness reduction</li> <li>• Possible cut lengths for the calculation: 1, 3, 10 m</li> </ul> |

### Numerical Output of Results (Count Measuring System)

|                        |                                                 |
|------------------------|-------------------------------------------------|
| <i>Absolute count:</i> | Determination of the length-related mass value. |
|------------------------|-------------------------------------------------|

### STATISTICS

|                            |                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Statistical values:</i> | <p>Overall result protocol with statistical data of the result columns.</p> <ul style="list-style-type: none"> <li>• Mean value</li> <li>• Median</li> <li>• Standard deviation s</li> <li>• Coefficient of variation CV</li> <li>• 95% confidence range</li> <li>• USP™ (USTER® STATISTICS Percentile)</li> <li>• Min. value</li> <li>• Max. value</li> </ul> |
| <i>USTER® STATISTICS:</i>  | <ul style="list-style-type: none"> <li>• Material-dependent USTER® STATISTICS are stored in the database.</li> <li>• Application: <ul style="list-style-type: none"> <li>– for the comparison of measured values with the USTER® STATISTICS,</li> <li>– setting of limit values based on the USTER® STATISTICS.</li> </ul> </li> </ul>                         |

# THE YARN INSPECTION SYSTEM

## Graphic Output of Results: SENSORS CS<sup>(1)</sup>, OH<sup>(2)</sup>

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Diagram:</i>                        | <ul style="list-style-type: none"> <li>• Sensitivity selectable in the ranges of <math>\pm 5\%</math> to <math>+500/-100\%</math> <sup>(1)</sup></li> <li>• Longitudinal scale in the ranges of 1 to 10000 m per line <sup>(1), (2)</sup></li> <li>• Cut lengths: normal, 0.1, 0.3, 1, 3, 10, 30, 100 m <sup>(1), (2)</sup></li> <li>• Positions of imperfections marked in the mass diagram <sup>(1)</sup></li> <li>• Possibility of representing 3D diagrams <sup>(1), (2)</sup></li> </ul> |
| <i>Spectrogram:</i>                    | <ul style="list-style-type: none"> <li>• Wavelength range up to 1/5 of the measured test length, but to a maximum of 1100 m <sup>(1), (2)</sup></li> <li>• Max. 160 channels (compared to the USTER® <i>TESTER 3</i>, the resolution has been doubled) <sup>(1), (2)</sup></li> <li>• Possibility of representing 3D spectrograms <sup>(1), (2)</sup></li> </ul>                                                                                                                              |
| <i>Variance-length curve:</i>          | <ul style="list-style-type: none"> <li>• Cut lengths from 2 cm to 600 m, whereby the maximum calculated cut length is about 1/15 of the measured test length (compared to the USTER® <i>TESTER 3</i>, the resolution has been doubled) <sup>(1), (2)</sup></li> <li>• Possibility of representing 3D variance-length curves <sup>(1), (2)</sup></li> </ul>                                                                                                                                    |
| <i>Frequency distribution diagram:</i> | Representation of the parameter variations within single tests <sup>(1), (2)</sup>                                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>Quantile diagram:</i>               | Representation of the mass variation in 4 traces with 4 different integration lengths <sup>(1)</sup>                                                                                                                                                                                                                                                                                                                                                                                          |

## Data Protection

|                |                                                                                                                                                                                                                                                                                                                                                   |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Backup:</i> | <ul style="list-style-type: none"> <li>• The data are stored on the 2nd hard disk with identical storage capacity.</li> <li>• For long-term storage, the data can be archived on the 2nd hard disk (backup unit) and presented again as required at a later date.</li> <li>• All settings, measurement values and diagrams are stored.</li> </ul> |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Input of Data, Output of Results, Languages, Units

|                                     |                                                                                                                                                         |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Dialog and report languages:</i> | English, German, French, Italian, Spanish, Portuguese, Turkish, Russian or Chinese can be selected via the operating menu (other languages on request). |
| <i>Possible units:</i>              | <ul style="list-style-type: none"> <li>• Count: ktex, tex, dtex, den, Nm, Nec, Nel, New, grains/yd, Y.S.W.</li> <li>• Speed: m/min, yd/min</li> </ul>   |
| <i>Test time:</i>                   | 6 seconds to 20 minutes, variable.                                                                                                                      |

## Selftest

|                        |                                                                                                                                                                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Function check:</i> | <ul style="list-style-type: none"> <li>• Initiated automatically when the installation is switched on.</li> <li>• Comprehensive function check and special test programs can be initiated at any time via the diagnosis menu.</li> </ul> |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## General

### General Ambient Conditions

#### Room climate:

The ambient conditions must be maintained in order to avoid any influencing on the test material according to ISO 139.1973 or DIN 53 802.

- Humidity: 65±2% relative humidity.
- Temperature: according to ISO 139.1973 or DIN 53 802  
20±2 °C for temperate climates  
27±2 °C for tropical climates

### Installation Data

#### Electrical connections:

Single phase mains with protective conductor.

#### Mains voltage range:

230 VAC; +6/-10%

#### Mains frequency:

48 – 62 Hz

#### Power consumption:

Max. 500 VA

#### Compressed air connection:

- Air quality: according to ISO 8573.1, class 3
- Min. pressure at inlet of air filter regulator: 6 bar
- Max. pressure at inlet of air filter regulator: 7 bar
- Requirement compressed air:
  - USTER® TESTER 5-M: Standard  
8 m³/h
- Min. internal diameter of the connection: 8 mm
- Max. length of the connection: 5 m
- Max. temperature difference between compressed and laboratory air: 10 °C

Compressed air connection for additional tester will be doubled. For detail please refer to the above mentioned information.

## THE YARN INSPECTION SYSTEM

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### Gross Weight of the Basic Installation

*Semiautomatic version:*

Approx. 100 kg

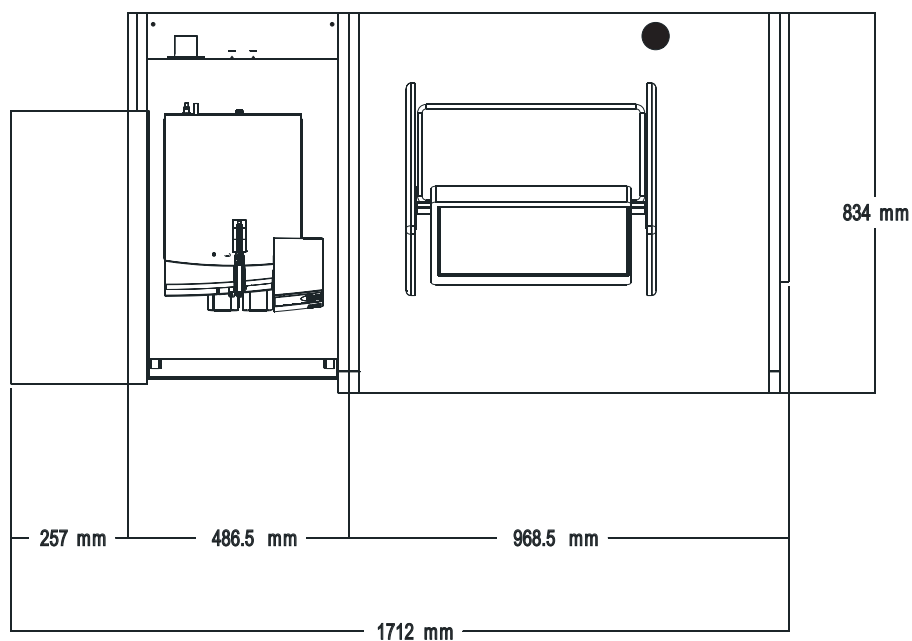
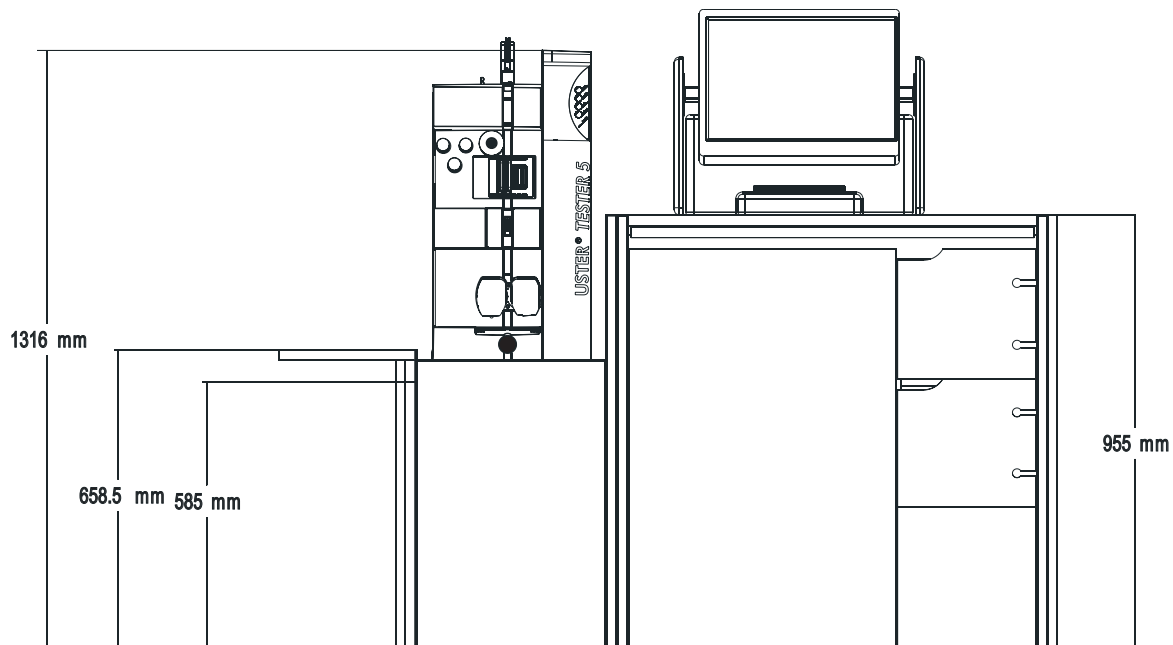
*Lab equipment:*

- Main table and waste box: Approx. 130 kg
- Tester table: Approx. 35 kg
- Floor loading capability:  $\geq 300 \text{ kg/m}^2$
- Noise level: 65-70 dB (A) depending on yarn and absorber pressure, at distance of 1 m (environmental noise approx. 50 dB).

# THE YARN INSPECTION SYSTEM

## Space required for the Installation of the USTER® *TESTER 5-M*

- At a vibration-free location.
- Manual or automatic count measurement systems must be set up on a separate table.
- Instrument table for USTER® *TESTER 5-M* available on request.



Subject to technical modifications

Uster Technologies has made all reasonable 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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