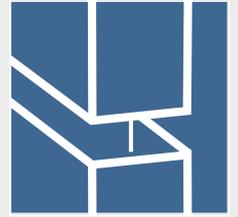


## Thickness Gauging System LTM-SMART

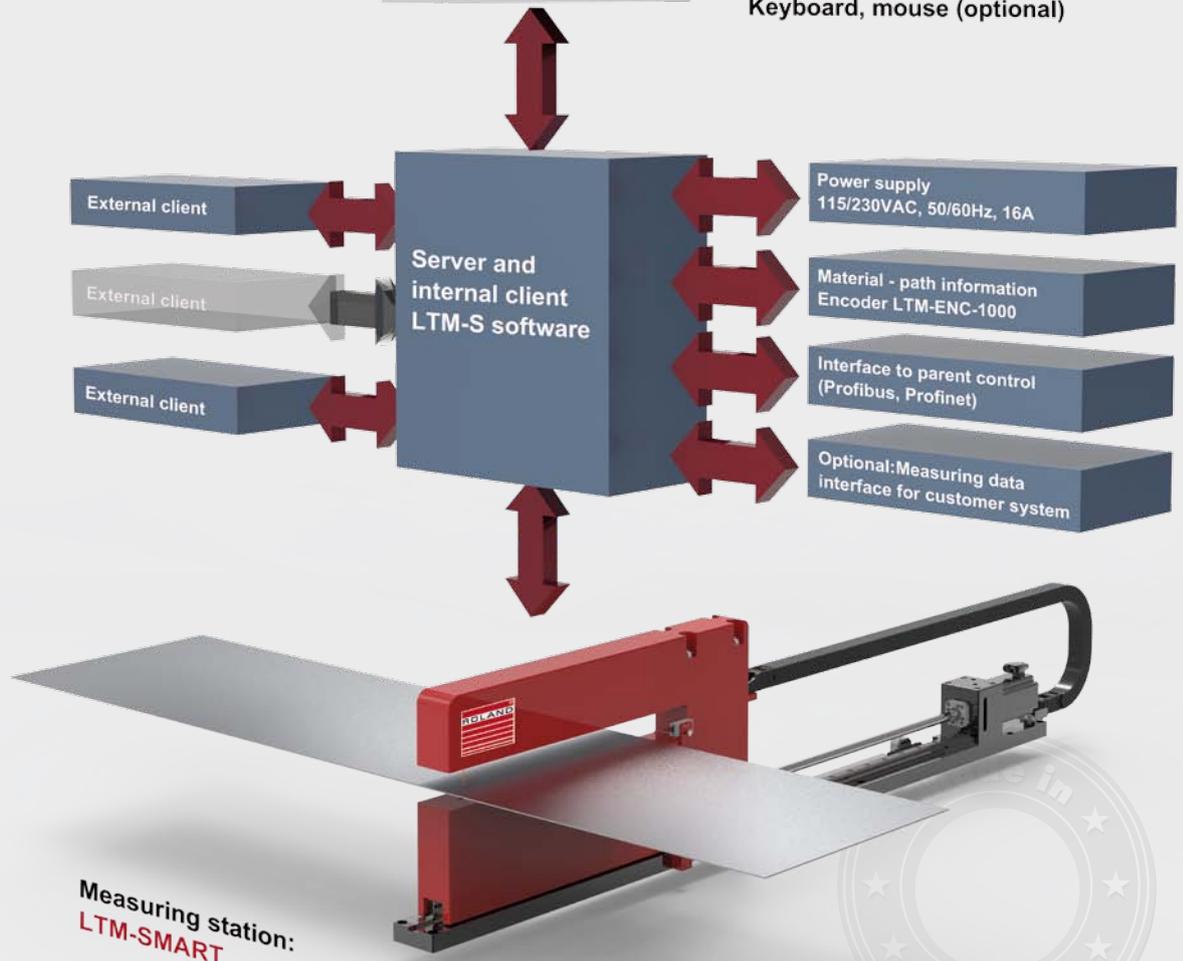


High performance measuring system for Static and Dynamic Thickness Gauging, with a measurement range from 150 to 450mm

- Measurable material thickness from 0.015 to 8mm
- Following measurement modes are possible:
  - Line measurement
  - Micro-traversing
  - Macro-traversing
  - Macro-traversing with track measurement
- High sampling frequency
- Innovative operating software LTM-S
- Possible interfaces: Profibus, Profinet



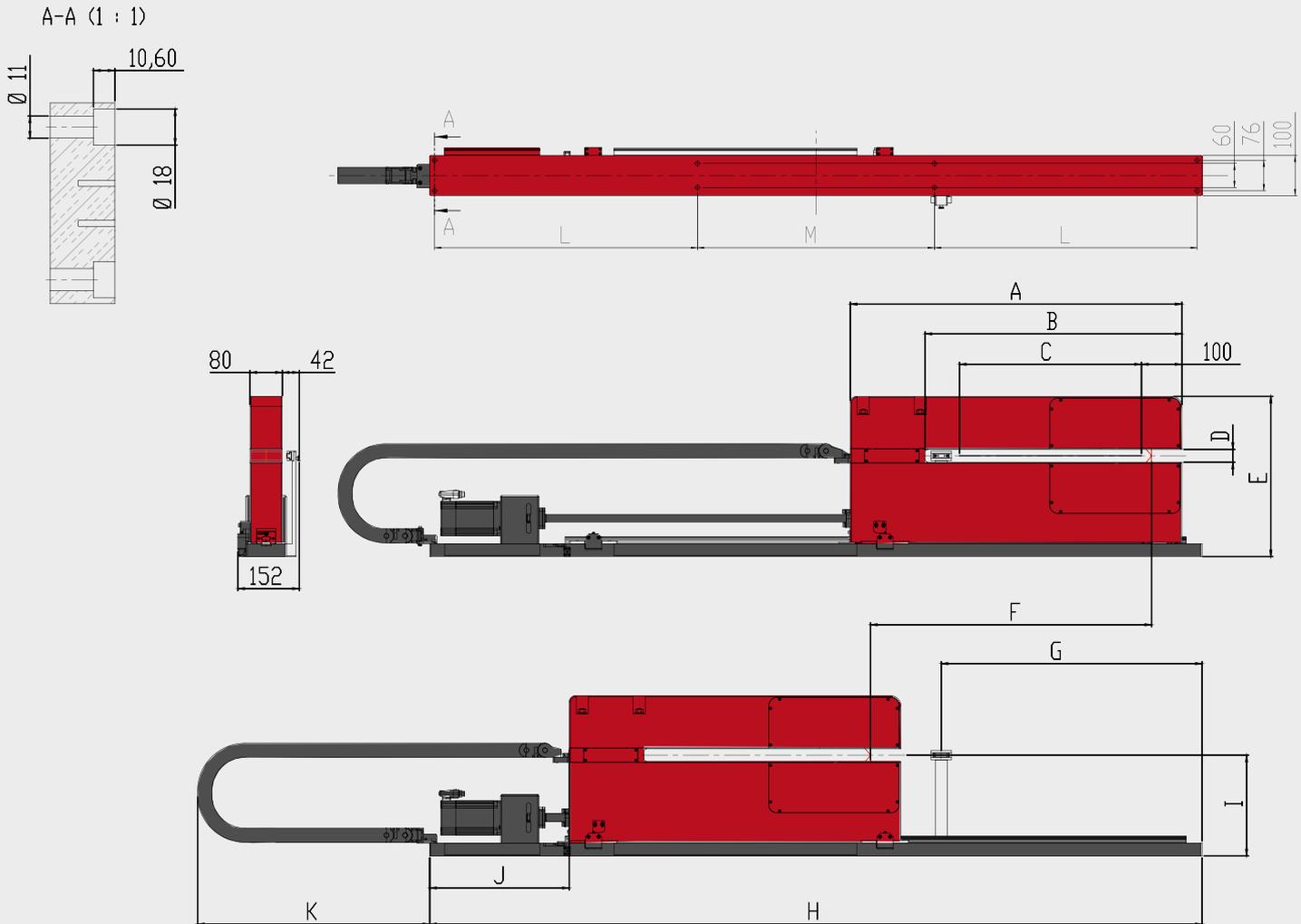
Touch screen:  
**LTM-TOUCH-21.5**  
Keyboard, mouse (optional)



THICKNESS GAUGING



## Dimensions / Configuration



Dimensions of LTM-SMART (All information in mm)

| LTM Variant / Dimension           | 150-06 | 300-06 | 450-06 | 150-20 | 300-20 | 450-20 |
|-----------------------------------|--------|--------|--------|--------|--------|--------|
| Measuring jaw length A            | 520    | 670    | 820    | 520    | 670    | 820    |
| Fork depth B                      | 335    | 485    | 635    | 335    | 485    | 635    |
| Max. measuring distance C         | 150    | 300    | 450    | 150    | 300    | 450    |
| Fork width D                      | 32     | 32     | 32     | 66     | 66     | 66     |
| Total height E                    | 399    | 399    | 399    | 433    | 433    | 433    |
| Max. travelling distance F        | 395    | 545    | 695    | 395    | 545    | 695    |
| Position calibration unit G       | 345    | 495    | 645    | 345    | 495    | 645    |
| Total length base plate H         | 1310   | 1610   | 1910   | 1310   | 1610   | 1910   |
| Measurement range center I        | 251    | 251    | 251    | 268    | 268    | 268    |
| Start travelling range J, approx. | 345    | 345    | 345    | 345    | 345    | 345    |
| Cable carrier overhang K, approx. | 424    | 499    | 574    | 424    | 499    | 574    |
| Distance between drilled holes L  | 450    | 550    | 650    | 450    | 550    | 650    |
| Distance between drilled holes M  | 386    | 486    | 586    | 386    | 486    | 586    |

Configuration table of the Thickness Gauging System LTM-SMART (All information in mm)

## Technical Data

| System configuration   |  |
|--|--|
| Type of measurement / Measurement mode   | Static and dynamic / Line measuring, Micro-traversing, Macro-traversing, Macro-traversing with track measuring   |
| Number of measuring stations <sup>1)</sup> :   | 1  |
| Operation:   | Via client software, e.g. internal client ROLAND LTM-S via 21.5" touch display   |
| Electric interface / Data interface:   | Profibus respectively Profinet / Ethernet  |
| Data type:   | Measurement protocol on measurement history with minimum, maximum and determined average thickness as CSV format   |
| Integrated measuring system analysis:  | Yes, integrated via ROLAND Thickness Gauging Software LTM-S  |
| Calibration of the system:   | Electromecanic   |
|  | Control is integrated via ROLAND Thickness Gauging Software LTM-S  |
| Track unit transversal to the material transport direction:  | Present, axis with step motor  |
| Max. measuring distance <sup>2)</sup> :  | 150mm / 300mm / 450mm  |
| Positioning accuracy   | ± 1mm  |
| Positioning velocity   | 12m/min  |
| Measurement speed  | 6m/min   |
| Process parameters   |  |
| Measuring material:  | Fe-, NF - materials (non-transparent)  |
| Material velocity <sup>3)</sup> :  | max. 1.800m/min  |
| Material temperature <sup>4)</sup> :   | max. 100°C (212°F)   |
| Permissible residual moisture on the strip surface   | 200mg/ m <sup>2</sup> per side (LTM-SMART XXX-06), evenly distributed<br>500mg/ m <sup>2</sup> per side (LTM-SMART XXX-20), evenly distributed   |
| Metrological characteristics   |  |
| Measurable material thickness:   | 0.015mm ... 2.0mm (LTM-SMART XXX-06) / 0.05mm ... 8mm (LTM-SMART XXX-20)   |
| Max. deviation of measurement at calibration normal <sup>5)</sup> :  | 0,5µm (LTM-SMART XXX-06) / 1,5µm (LTM-SMART XXX-20)  |
| Work space:  | 6mm, ± 3mm around measuring focus (LTM-SMART XXX-06)<br>20mm, ± 10mm around measuring focus (LTM-SMART XXX-20)   |
| Resolution:  | 0.1µm  |
| Repeatability <sup>6)</sup> :  | ± 0.5µm (LTM-SMART XXX-06) / ± 1.0µm (LTM-SMART XXX-20)  |
| The specified repeat accuracy respectively measurement deviation applies to an angle deviation ≤ 1° and variation of the pass line   | ± 1 mm (LTM-SMART XXX-06) / ± 3 mm (LTM-SMART XXX-20)  |
| Sampling interval:   | 20 / 50 / 100 / 200 / 500 / 1000 µs  |
| Laser characteristics  |  |
| Linearity:   | ± 1,2µm (LTM-SMART XXX-06) / ± 4,0µm (LTM-SMART XXX-20)  |
| Light spot dimensions:   | 0.05mm x 2.0mm   |
| Measuring principle:   | Laser triangulation  |
| Laser type, wave length:   | Semi conductor, red, 650 nm  |
| Laser class:   | 2 (DIN / IEC), max. 0.95mW   |
| Connections, consumption, ambient conditions   |  |
| Electric connection:   | 115V/230VAC,16A  |
| Protection class:  | Switch cabinet IP65 / Sensors IP67   |
| Ambient temperatures:  | Measuring stations <sup>6)</sup> : 5 – 45°C (41-113°F) / Control unit: 5 – 45 °C (41-113°F) / relative air humidity:10 – 95%   |
| Air supply:  | Pressure: min. 6bar; max. 8bar / amount approx. 15m <sup>3</sup> /h  |
| Compressed air quality <sup>7)</sup> :   | Solid particles: quality class 5 = max. 40µm / particle density < 10mg/m <sup>3</sup> / water content: quality class 5 = 9.4g/m <sup>3</sup> at 10°C / oil content: quality class 4 < 5mg/m <sup>3</sup> |
| Mechanic connection of compressed air  | Hose 6 / 4mm   |
| <sup>1)</sup> A measuring station consists of 2 laser sensors<br><sup>2)</sup> The measuring path depends on the selected system and at the same time it describes the max. possible material width that can be measured.<br><sup>3)</sup> The distance of the measuring points increases with increasing speed, depending on the selected sampling interval.<br><sup>4)</sup> Other material temperatures upon request<br><sup>5)</sup> The specified repeatability respectively the deviation of measurement applies to an angular deviation of ≤ 1° and variation of the passing line<br><sup>6)</sup> Only if the prescribed calibration protocol is followed<br><sup>7)</sup> DIN ISO 8573-1, before the maintenance unit (scope of delivery) |  |

## Order information

| Designation   | Part name   | Description  |
|---|---|--|
| Control cabinet with server and internal client, as well as the necessary pneumatic units | <b>LTM-CONTROL-C1-PY<sup>1)</sup></b>             | Rittal compact control cabinet 800mm x 600mm x 350mm with all necessary electrical hardware components to realize the measurement task. <ul style="list-style-type: none"> <li>• Beckhoff Industrial PC CX5140 with operating system and I/O module mounted on TwinCat, Profinet or Profibus interface, license clamp etc.</li> <li>• Measurement controller / Laser control unit for two laser separation distance sensors.</li> <li>• Integrated interface for control from the customer's side Y<sup>1)</sup>, Profibus or Profinet.</li> <li>• Server and client software LTM-S with recipe database, measurement mode selection, profile and trend display, user administration, etc.</li> <li>• With all the necessary electrical connections for the C-Frames, reference and limit switches etc. on the terminal strip.</li> <li>• Separate accessories, such as pressure switch for air purge.</li> </ul>                |
| Measuring C-frame version LTM-SMART   | <b>LTM-SMART-XXX<sup>2)</sup>-ZZ<sup>3)</sup></b> | Measuring C-frame with linear axis, a maximum possible measuring range of XXX <sup>2)</sup> mm, stepper motor, two separation distance sensors (triangulation lasers), calibration unit and all other necessary units to enable the measuring task (except control and operation). The measuring yoke consists of the following components: <ul style="list-style-type: none"> <li>• Anti-vibration and rigid C-frame made from solid Aluminum construction.</li> <li>• Linear axis with guide and ball screw, as well as a stepper motor with encoder to ensure the traverse movement of the C-frame.</li> <li>• 2 separation distance sensors (triangulation lasers) with a measuring range of ZZ<sup>3)</sup> mm.</li> <li>• Temperature sensors, end and reference switches.</li> <li>• Integrated calibration unit with quick change adapter for the supplied measuring standard</li> <li>• Laser air purge unit</li> </ul> |
| Connection cables   | <b>LTM-C-SCSENSG-GG</b>                           | Connection cable for the C-frame (sensors) LTM-SMART to the control cabinet type LTM-Control-C1-PY <sup>1)</sup> . <ul style="list-style-type: none"> <li>• 2 pieces per C-frame as required for a LTM-SMART.</li> <li>• One end with circular connector for connection to the sensor, the other end with rectangular connector for connection to the measuring controller</li> <li>• Standard length 10m<sup>4)</sup>.</li> </ul>   |
|   | <b>LTM-C-CABLE-SET</b>                            | Connection cable for the drive unit of the C-frame of LTM-SMART to the control cabinet LTM-Control-C1-PY <sup>1)</sup> consisting of: <ul style="list-style-type: none"> <li>• 1 piece of motor power and control cable for connecting the LTM-SMART to the control cabinet LTM-CONTROL-C1-PY<sup>1)</sup>.</li> <li>• 2 piece limit switch cable for connecting the LTM-SMART to the control cabinet LTM-CONTROL-C1-PY<sup>1)</sup></li> <li>• 1 piece reference switch cable for connecting the LTM-SMART to the control cabinet LTM-CONTROL-C1-PY<sup>1)</sup></li> <li>• Standard length 5m<sup>4)</sup>.</li> </ul>   |
|   | <b>LTM-C-CENCODS-G (Option)</b>                   | Connection cable for encoder to the ROLAND system, with straight M23 cable socket equipped for connection to the encoder and prepared at the other end for terminal connection in the control cabinet. Standard length 5m <sup>4)</sup> .  |
| Option Control unit   | <b>LTM-TOUCH-21.5</b>                             | 21.5" touch monitor for displaying and operating the internal client LTM-S <ul style="list-style-type: none"> <li>• Rittal compact control cabinet 600mm x 380mm x 200mm with all necessary electrical hardware components, incl. 2 x USB port 3.0.</li> <li>• 21.5" touch monitor, mounted in the control cabinet.</li> <li>• With cable set 5m<sup>4)</sup> for connection to the corresponding control cabinet LTM-CONTROL-C1-PY<sup>1)</sup>.</li> </ul>   |
| Option Encoder  | <b>LTM-ENC-1000</b>                               | Installation in the customer's system to generate the necessary travel signals with clamping flange 58mm and a shaft diameter of 10mm. Optionally, if no route information can be provided by the customer.  |

<sup>1)</sup> Interface to customer control: Y = N - Profinet, Y = R - Profibus  
<sup>2)</sup> Maximum measuring distance XXX = 150mm or 300mm or 450mm.  
<sup>3)</sup> Measuring range ZZ = 06mm (± 3mm) respectively 20mm (± 10mm)  
<sup>4)</sup> Other lengths upon request.

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