TR-Electronic
Overview linear encoder
TR-Electronic - Your Partner in Automation

For more than 25 years TR-Electronic has been a very successful company. We have over 300 employees with global reach. Our recipe for success: a lot of innovation and flexibility in everything we do. With our automation and communication capabilities we deliver quality products for the automation industry.

TR-Electronic GmbH is a constant within the sensor industry – more precisely in the development and production of digital angular and distance measurement systems for automation: from absolute and incremental rotary encoder, magnetostrictive transducers and laser distance measurement systems, electrical compact drives and servo controllers.

We offer products that are individually designed to meet your needs. As a response to new technology developments, we created the TRsystems product range, in order to provide you with complete solutions.

To us in Germany, as well as to our representatives abroad, it is very important to be innovative, precise and flexible. We respond quickly, to meet your requirements.

Closely connected to our region

It is important to us that we develop and produce according to RoHS guidelines our products in Germany. We are proud to be one of our region's biggest employer. It is all of a piece by having everything in Trossingen. We can combine all our advantages starting with the development over the production and quality control up to the presentation and delivery.

Another success factor of our company are our superb trained employees. Our employees account for the quality and the success of our products. We create a comfortable and excellent working atmosphere, in which our employees can self-actualize and be a part of it. Being on their own responsibility and creative is very important to us. We support this with an ideal work environment for example by providing ergonomic work stations.

Educational programme

In order to have a successful future, we put a lot of effort into the education of our young employees. We give high school students in our region the opportunity of a practical training to explore the different departments in our company. Our trainees also have a good chance of being taken over.

Our commitment to colleges and universities is comparable. As of now, we offer talented and ambitious students the opportunity to write their thesis with us. Additionally, we participate in establishing a semi privately sponsored college in Tuttlingen. This is a new thought out model where we engage with teachers, presentations, excursions, working material and work labs in rooms of our company.
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How to find your fitting linear encoder
Choose according to your requirements:

1. Linear absolute distance measurement system LA
For measurement length up to 4,000 mm. When the positioning sensor is mechanically moved when turned off, the actual position is shown after turning on the supply voltage. The LA system works contactless and wear-free. The linear absolute positioning sensors are perfect to build into a hydraulic cylinder. The measurement rod achieves a compression strength up to 600 bar (TÜV proven).

Specialties stainless steel rod, for assembling directly into the hydraulic cylinder
Measurement range up to 4 m
Resolution 

2. Linear absolute distance measurement system in a profile housing LP
The difference to the LA positioning system is the version with the profile housing. The measured length is protected in an extruded section out of aluminum. The position sensor is also available with a measuring slide for easy mounting. The distance of the position sensor to the profile housing will be adjusted through the measuring slide, only the actuator is mounted on the measuring slide.

Specialties aluminum profile, multiple magnet function
Measurement range up to 20 m
Resolution 

3. High resolution absolute positioning sensor glass measuring LT
The LT measuring system works with a photo electronic scanning. The smallest possible measurement step is 0,1 µm. Therefore, it is ideally qualified for applications demanding high resolution and accuracy.

Specialties aluminum profile high resolution
Measurement range up to 3 m
Resolution 

4. Laser distance measurement system LE
Our laser distance measurement devices are optical sensors, which are able to capture longer distances contact-free and controller capable. The individual components of the measuring system are light source, receiving optic, electronic evaluation and data interface as well as reflector.

Specialties controller capable, closed loop control contact-free
Measurement range 0,2 up to 240 m
Resolution 0,1 mm

5. Barcode measurement system
The BE90 is a measuring system reading the measured length with a barcode. This is how you can capture an absolute position when having non-linear movements and curvy systems.

Specialties also for non-linear movements and winding systems
Measurement range up to 10 km
Resolution 1 mm

Interfaces (others on request)
SSI
ISI
Parallel
SIN/COS
LWL

Products
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Plastic housing 14
Aluminum profile housing 15

High resolution absolute positioning sensor 16
Laser distance measurement system 18
Product overview
TR-Electronic GmbH

TR-Electronic - Your Partner in Automation

Programmable rotary encoder
The standard of automation technology, available with all current fieldbus systems: PROFIBUS, Interbus, CANopen, DeviceNet and Industrial Ethernet. Including TR-Electronic’s variety of mechanics, interfaces and functions.

Incremental rotary encoder
From 35 mm external diameter up to 55 mm hollow shaft - we always have a solution!

Motor feedback systems
Feedback encoder for modern positioning drives. Optional integrated or directly mounted on the drive shaft via hollow shaft.

Linear absolute displacement sensors
The compact class for linear absolute measurement. Directly bus-ready, suitable for harsh environmental conditions and for installation in hydraulic cylinders.

Absolute high resolution linear measurement systems
Linear measurement with absolute sub-micron resolution without referencing.
Laser distance measuring systems
Absolute and wear-free measurement of distances up to 200 m via SSI, fieldbus and Ethernet.

Intelligent positioning drive
Absolute positioning directly via fieldbus. Integrated motor, power amplified position control-loop controller, absolute encoder, PLC functions and fieldbus interface.

Heavy-duty industrial PC
Double shock proof mounted housing isolates the electronics from vibration, while front access (MIPC) simplifies configuration and start up. Choose from our wide selection of housings.

SPC - the PLC for PC
Turns every PC into an efficient PLC under S5/S7 or IEC 1131 protocols. Combines the comfort of PC control with the safety of a separate processor for PLC tasks.

@ctiveIO - more than fieldbus modules
Modular, rugged fieldbus node system I/O-node, small-scale PLC, decentralized axis controller, high performance cam controller, DIN-rail mounted industrial PC, servo controller for the hydraulic ... with commercial fieldbus systems, such as Profibus-DP, CANopen, DeviceNet, LightBus ... and ETHERNET as option!
Storage and logistics

It is especially important for storage equipment such as rack feeders, transfer units and cranes to have an effective, decentralized measurement and control technology for easy project planning and fast start up.

Packaging industry

Flexible automation solutions according to our customers’ wishes are the intelligent base for a successful machine concept within the packaging industry. High processing speed, enables fast cycle times and larger lot sizes. Absolute measurement systems save time consuming Homing Sequences. Highly integrated, intelligent sensors also allow for distributed control. When it comes to needing higher precision, we have a perfect solution.
Metal working

For years the world of presses and stamping has been a specialty of TR-Electronic. We design and develop products from the beginning, in such a way that they resist high shock and vibration impacts.

Wood-working

Intelligent, decentralized and efficient sensors with on-board processing and components that work, despite high temperature fluctuations, are the base for automation solutions within the wood-working industry. Our specialty is to equip and network transfer machines, machine centers and installation fields, especially if you have particular requirements for your machine.
TR-Electronic - For Each Sector the Perfect Solution

Print technology and paper conversion

Fast signal processing for printing machines enables higher accuracy and decentralized compact drives automate adjusting procedures. With stainless steel housings, rotary encoders even sustain aggressive mediums like groundwood pulp in paper machines. Small absolute rotary encoders measure movements in tight spaces.

Event technology

Our rotary encoders offer safety in all required classes for stage technology and other SAFE applications. From rotary encoders with additional incremental tracks up to SIL 3 certified safety rotary encoders, we offer the right solution for safety.
Renewable energy

With intelligent tracking of photovoltaic constructions the efficiency is improved and the automation accelerated. High resolution rotary encoders enable exact positioning. Compact drives reduce the number of connected components and provide years of orientation of your construction towards the sun.

Plastics processing

Various measurement tasks within plastic processing machines require fast signal processing and high precision. Linear measurement systems, for implementing into hydraulic cylinders, blend smoothly into injection molding machines. Industrial PCs are an universal platform for user specific control systems for series production and special machines.
Linear Measurement Systems for Special Applications

LMR48 - positioning sensor to install into the hydraulic cylinder

Contact-free. Precise. Reliable.
The new linear absolute positioning system measures contact-free and therefore wear-free. The established magnetostrictive measuring method provides for a precise and reliable positioning response and securely resolves up to 0,05mm. The flat, compact design of the sensor makes the complete integration into the hydraulic sensor easier. On one hand the sensor is optimal protected and on the other the total length of the hydraulic drive is reduced. This is a big advantage especially when having less mounting space or docking cylinder onto a ball joint.
The positioning system LMR 48 is available with a measuring length up to 2m. The controller communicates with the sensor over analog signal or CANopen.

- contact-free and wear-free
- precise and reliable positioning response
- the sensor is completely integrated into the hydraulic cylinder and therefore optimal protected
- mounting the cylinder with ball joints is possible

<table>
<thead>
<tr>
<th>Measurement length</th>
<th>up to 2 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0,01 mm</td>
</tr>
<tr>
<td>Interfaces</td>
<td>Analog and CANopen</td>
</tr>
</tbody>
</table>

Further information you will find on page 13

LE 200 - up to 240m contact-free measurement

Absolute. Contact-free. Controller suitable.
The series of the laser distance measuring devices are optical sensors.
You can capture longer distances contact-free and controller suitable. The components of the laser positioning system are the laser light source, light collector, electronic evaluation and data interfaces such as a reflector. The device sends out a modulated light beam which is reflected by the reflector. Out of the phase difference between the send and received light beam, the distance is calculated 1000 times per second und issued with a adjustable resolution of up to 0,1 mm (physical resolution 0,8 mm).

- capturing of linear movements
- particularly suitable for storage and logistics
- programmable
- optional with preliminary setup for connecting a cooling circuit
- stability of the measurement through its intensity / temperature control
- robust design

<table>
<thead>
<tr>
<th>Measurement length</th>
<th>0,2 m up to 240 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0,1 mm</td>
</tr>
<tr>
<td>Interface</td>
<td>PROFIBUS+SSI, CANopen, DeviceNet, Interbus-S, EtherNet/IP, SSI (others on request)</td>
</tr>
</tbody>
</table>

Further information you will find on page 18
Both linear absolute positioning sensors (LA50 and LA80) are suitable for the level measurement in aggressive mediums. To achieve a high resistance against the mediums, the measurement systems and the electronic are put into a tube with a flange out of polypropylene.

+ suitable for the use in aggressive mediums
+ for the galvanic and the food production
+ plastic housing
+ capturing of linear movements
+ contact-free, wear-free scanning
+ capable of parametization
+ adjustment over input

Example for substances (others possible):
- calcium chloride, watery (in each concentration)
- calcium phosphate
- calcium sulfate
- quinine
- chloride, gaseous dry and moist
- chloroform (technical pure)
- chromic acid, watery (concentration 50%)
- citrus juices
- cola concentrate
- sulfur dioxide, dry and moist (in each concentration)
- sulfur acid, watery (concentration up to 50 %, 98 %)
- sea water
- soap solution, watery (in each concentration)
- mustard
- silver nitrate
- silicon oil
- liquor
- sulfate, watery solution (each concentration)
- turpentine oil (technical pure)
### Linear Absolute Positioning Sensor in a Stainless Steel Housing

<table>
<thead>
<tr>
<th>Specifics and specifications</th>
<th>LA 46</th>
<th>LA 46 H</th>
<th>LA 66</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance measurement, contact-free and wear-free, for installing into a hydraulic cylinder</td>
<td>With replaceable distance sensor, to set parameters, positioning value adjustment</td>
<td>For installing into a hydraulic cylinder, cam controller up to eight cams</td>
<td></td>
</tr>
</tbody>
</table>

**Product picture**

- **LA 46**
- **LA 46 H**
- **LA 66**

<table>
<thead>
<tr>
<th>Version</th>
<th>Stainless steel tube</th>
<th>Stainless steel tube</th>
<th>Stainless steel tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement length</td>
<td>50 ... 4.000 mm</td>
<td>50 ... 4.000 mm</td>
<td>100 ... 4.000 mm</td>
</tr>
<tr>
<td>Resolution (max.)</td>
<td>0,005 mm</td>
<td>0,005 mm</td>
<td>0,01 mm</td>
</tr>
<tr>
<td>Analog Interface</td>
<td>12/16 bit</td>
<td>12/16 bit</td>
<td>12/16 bit</td>
</tr>
<tr>
<td>Accuracy (typically)</td>
<td>± 0,15 mm</td>
<td>± 0,15 mm</td>
<td>± 0,05% measured length</td>
</tr>
<tr>
<td>Hysteresis (max.)</td>
<td>± 0,02 mm</td>
<td>± 0,02 mm</td>
<td>± 0,1 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interfaces (others on request)</th>
<th>SSI Analog</th>
<th>SSI Analog</th>
<th>Parallel Analog NSW LWL FIPIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>24 VDC, - 20 %, +10 %</td>
<td>24 VDC, - 20 %, +10 %</td>
<td>24 VDC, - 20 %, +10 %</td>
</tr>
<tr>
<td>Connection technology</td>
<td>Cable connection Connector</td>
<td>axial</td>
<td>axial</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 ... +70 °C</td>
<td>0 ... +70 °C</td>
<td>0 ... +70 °C</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 65</td>
<td>IP 65</td>
<td>IP 65</td>
</tr>
<tr>
<td>Programmability</td>
<td>TRWinProg, PT100 bus</td>
<td>TRWinProg, PT100 bus</td>
<td>TRWinProg, PT100 bus</td>
</tr>
<tr>
<td>Further options and accessories</td>
<td>Separate outer tube for easy sensor switch, for the direct mounting into the hydraulic cylinder</td>
<td>Optional work temperature: -20 °C ... +70 °C, multiple magnet function, up to 30 magnets, further interfaces deliverable</td>
<td>Multiple magnet function up to 12 magnets, further interfaces deliverable</td>
</tr>
</tbody>
</table>

**Notes**

- **B INTER**
- **US**
- **POWERLINK**
- **ETHERNET**
- **real-time technology**

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*Source: [Reelectronic]](https://www.reelectronic.com)*
# Linear Absolute Positioning Sensor in a Plastic Housing

<table>
<thead>
<tr>
<th>Specifics and specifications</th>
<th>LMR 48</th>
<th>LA 50</th>
<th>LA 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>For complete installation into a hydraulic cylinder (also with ball joint), short total length</td>
<td>For using in aggressive mediums or the area of galvanic</td>
<td>For using in aggressive mediums with float</td>
<td></td>
</tr>
</tbody>
</table>

## Product picture

- ![Product picture](image1.png)
- ![Product picture](image2.png)
- ![Product picture](image3.png)

## Version

- Compact, flat design
- Plastic tube
- Plastic tube

## Measurement length

- Up to 2.000 mm
- 100 ... 1.000 mm
- 100 ... 4.000 mm

## Resolution (max.)

<table>
<thead>
<tr>
<th>Analog Interface</th>
<th>LMR 48</th>
<th>LA 50</th>
<th>LA 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>0,01 mm</td>
<td>0,005 mm</td>
<td>0,05 mm</td>
<td></td>
</tr>
<tr>
<td>12 bit</td>
<td>12/16 bit</td>
<td>16 bit</td>
<td></td>
</tr>
</tbody>
</table>

## Accuracy (typically)

- ± 0,05 % measured length
- ± 0,15 mm
- ± 0,05 % measured length

## Hysteresis (max.)

- ± 0,2 mm
- ± 0,02 mm
- ± 0,05 mm

## Interfaces

- Analog
- SSI
- SSI

### (further interfaces on request)

## Supply voltage

- 12 VDC, - 5 %, +10 %
- 24 VDC, - 10 %, +10 %
- 24 VDC, - 20 %, +10 %

## Connection technology

### Cable connection

- axial
- on the cable
- on the cable

## Temperature range

- -40 ... +85 °C
- 0 ... +70 °C
- 0 ... +70 °C

## Protection class

- IP 65
- IP 68
- IP 68

## Programmability

- TRWinProg, bus
- TRWinProg, PT100
- TRWinProg, PT100

## Further options and accessories

- Over 2.000 mm on request
- Thread M18 x 1.5 further interfaces deliverable, optional PROFIBUS with external box
- Thread DIN 259 - RS2

## Notes

- Additional notes on specifications and performance characteristics.
### Product overview

**LP, LMP**

#### Linear Absolute Positioning Sensor in a Aluminum Profile Housing

<table>
<thead>
<tr>
<th>Specifics and specifications</th>
<th><strong>LP 46</strong></th>
<th><strong>LMP 30</strong></th>
<th><strong>LMP 30 BUS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance measurement for engineering with a guided magnet</td>
<td>Distance measurement in a flat profile housing</td>
<td>Distance measurement in a flat profile housing</td>
<td></td>
</tr>
</tbody>
</table>

#### Version
- **LP 46**: aluminum strand casting profile
- **LMP 30**: aluminum strand casting profile
- **LMP 30 BUS**: aluminum strand casting profile

<table>
<thead>
<tr>
<th>Measurement length</th>
<th>50 ... 4.000 mm</th>
<th>50 ... 4.000 mm</th>
<th>50 ... 4.000 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution (max.)</td>
<td>0,005 mm</td>
<td>0,05 mm</td>
<td>0,005 mm</td>
</tr>
<tr>
<td>Analog Interface</td>
<td>12/16 bit</td>
<td>12 bit</td>
<td>12 bit</td>
</tr>
<tr>
<td>Accuracy (typically)</td>
<td>± 0,15 mm</td>
<td>± 0,2 mm</td>
<td>± 0,1 mm *</td>
</tr>
<tr>
<td>Hysteresis (max.)</td>
<td>± 0,02 mm</td>
<td>± 0,02 mm</td>
<td>± 0,02 mm</td>
</tr>
</tbody>
</table>

#### Interfaces
- **LP 46**: SSI Analog
- **LMP 30**: SSI Analog Start-Stop
- **LMP 30 BUS**: SSI Analog Start-Stop

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>24 VDC, -20 %, +10 %</th>
<th>24 VDC, -20 %, +10 %</th>
<th>24 VDC, -20 %, +10 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection technology</td>
<td>Cable connection Connector</td>
<td>on the cable axial</td>
<td>axial</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 ... +70 °C</td>
<td>0 ... +70 °C</td>
<td>0 ... +70 °C</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 65</td>
<td>IP 65</td>
<td>IP 65</td>
</tr>
<tr>
<td>Programmability</td>
<td>TRWinProg bus</td>
<td>- bus</td>
<td>- bus</td>
</tr>
<tr>
<td>Further options and accessories</td>
<td>Multiple magnet function up to 3 magnets: 0,005 mm resolution up to 30 magnets: 0,05 mm resolution</td>
<td>-</td>
<td>Multiple magnet function up to 3 magnets: 0,005 mm resolution up to 30 magnets: 0,05 mm resolution * up to 1,000 mm</td>
</tr>
</tbody>
</table>

#### Notes
## Linear Absolute Positioning Sensor in a Aluminum Profile Housing

<table>
<thead>
<tr>
<th>Specifics and specifications</th>
<th>LMC 55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cascadable up to 20m multiple magnet scanning, wear-free scanning</td>
<td></td>
</tr>
</tbody>
</table>

| Product picture | ![Product picture](image_url) |

<table>
<thead>
<tr>
<th>Version</th>
<th>Aluminum profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement length</td>
<td>5.000 ... 20.000 mm</td>
</tr>
<tr>
<td>Resolution (max.)</td>
<td>0,05 mm</td>
</tr>
<tr>
<td>Analog Interface</td>
<td></td>
</tr>
<tr>
<td>Accuracy (typically)</td>
<td>± 0,02 % measured length</td>
</tr>
<tr>
<td>Hysteresis (max.)</td>
<td>≤ 0,1 mm</td>
</tr>
<tr>
<td>Interfaces</td>
<td></td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 VDC, -20 %, +10 %</td>
</tr>
<tr>
<td>Connection technology</td>
<td></td>
</tr>
<tr>
<td>Cable connection</td>
<td>-</td>
</tr>
<tr>
<td>Connector</td>
<td>axial</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 ... +70 °C</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP65</td>
</tr>
<tr>
<td>Programmability</td>
<td>TRWinProg, PT100 bus</td>
</tr>
<tr>
<td>Further options and accessories</td>
<td>Further interfaces deliverable, customer specific adjustments on request up to 30 magnets</td>
</tr>
</tbody>
</table>

### Notes
### High Resolution Absolute Positioning Sensors

<table>
<thead>
<tr>
<th>Specifics and specifications</th>
<th>LT - S</th>
<th>LT - G</th>
<th>LT - PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance measurement, high resolution</td>
<td>Distance measurement, high resolution, compact, space saving housing</td>
<td>Distance measurement, high resolution, usable in a running production</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product picture</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Version</th>
<th>measuring slide</th>
<th>compact</th>
<th>decoupled measurement axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement length</td>
<td>140 ... 3,040 mm</td>
<td>60 mm</td>
<td>100, 150, 200, 250 mm</td>
</tr>
<tr>
<td>Resolution (max.)</td>
<td>0,1 µm</td>
<td>0,1 µm</td>
<td>0,1 µm</td>
</tr>
<tr>
<td>Accuracy (typically)</td>
<td>± 5 µm</td>
<td>± 5 µm</td>
<td>± 5 µm</td>
</tr>
<tr>
<td>Interfaces</td>
<td>SSI, incremental 5V/24V, SIN/COS</td>
<td>SSI, incremental 5V/24V, SIN/COS</td>
<td>SSI, incremental 5V/24V, SIN/COS</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>8 ... 27 VDC</td>
<td>8 ... 27 VDC</td>
<td>8 ... 27 VDC</td>
</tr>
<tr>
<td>Connection technology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cable connection</td>
<td>on the cable</td>
<td>on the cable</td>
<td>on the cable</td>
</tr>
<tr>
<td>Connector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 ... +65 °C</td>
<td>0 ... +65 °C</td>
<td>0 ... +65 °C</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 50</td>
<td>IP 54</td>
<td>IP 66</td>
</tr>
<tr>
<td>Programmability</td>
<td>TRWinProg</td>
<td>TRWinProg</td>
<td>TRWinProg</td>
</tr>
<tr>
<td>Further options and accessories</td>
<td>Analog, CANopen and over interface adapter, also with multiple sensing heads within the same system</td>
<td>Analog, CANopen and over interface adapter</td>
<td>Analog, CANopen and over interface adapter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Return spring</td>
</tr>
</tbody>
</table>

### Notes

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### LT - RV

#### Specifics and specifications
- Distance measurement, high resolution
- For the use in heavy industry

#### Product picture
![Product picture](image)

#### Version
- protection housing

#### Measurement length
- 400, 520 mm

#### Resolution (max.)
- 0.1 µm

#### Accuracy (typically)
- ± 5 µm

#### Interfaces
- SSI, incremental 5V/24V, SIN/COS

#### Supply voltage
- 8 ... 27 VDC

#### Connection technology
- Cable connection on the cable

#### Temperature range
- 0 ... +65 °C

#### Protection class
- IP66

#### Programmability
- TRWinProg

#### Further options and accessories
- Analog, CANopen, and over interface adapter
- Return spring

### Notes
## Laser Distance Measurement System

<table>
<thead>
<tr>
<th>Specifics and specifications</th>
<th>LE 200</th>
<th>LLB 60 D</th>
<th>BE 90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance measurement</td>
<td></td>
<td>Distance measurement RS232 and RS422</td>
<td></td>
</tr>
<tr>
<td>Product picture</td>
<td><img src="image1.png" alt="LE 200" /></td>
<td><img src="image2.png" alt="LLB 60 D" /></td>
<td><img src="image3.png" alt="BE 90" /></td>
</tr>
<tr>
<td>Version</td>
<td>reflector</td>
<td>without reflector</td>
<td>barcode</td>
</tr>
<tr>
<td>Measurement length</td>
<td>0,2 ... 240 m</td>
<td>0,05 ... 65 m (without reflector) 0,05 ... 500 m (with reflector)</td>
<td>up to 10.000 m</td>
</tr>
<tr>
<td>Resolution (max.)</td>
<td>0,1 mm</td>
<td>0,1 mm</td>
<td>1 mm</td>
</tr>
<tr>
<td>Accuracy (typically)</td>
<td>± 2 mm</td>
<td>± 1,5 mm</td>
<td>± 1 mm</td>
</tr>
<tr>
<td>Cycle time</td>
<td>0,001 s</td>
<td>0,15 - 4 s</td>
<td>0,002 s</td>
</tr>
<tr>
<td>Interfaces</td>
<td>SSI</td>
<td>Analog</td>
<td>SSI</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>18 ... 27 VDC</td>
<td>9 ... 30 VDC</td>
<td>10 ... 30 VDC</td>
</tr>
<tr>
<td>Connection technology</td>
<td>radial / axial</td>
<td>axial</td>
<td>radial</td>
</tr>
<tr>
<td>Cable connection</td>
<td>radial / axial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connector</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>-30 ... +50 °C</td>
<td>-10 ... +50 °C</td>
<td>0 ... +40 °C</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 65, laser safety class 2</td>
<td>IP 65, laser safety class 2</td>
<td>IP 65</td>
</tr>
<tr>
<td>Programmability</td>
<td>TRWinProg bus</td>
<td>over PC</td>
<td>BE-Config bus</td>
</tr>
<tr>
<td>Further options and accessories</td>
<td>Heating for the inside of the housing and front window</td>
<td>Heating for the inside of the housing and front window</td>
<td>Heating</td>
</tr>
</tbody>
</table>

### Notes

- POWERLINK
- ETHERNET
- real-time technology
Electrical and Mechanical Accessories

Programming adapter
Connects the device to the PC. Changes signals from USB to encoder programming interface and is electrically isolated. We suggest the use in conjunction with one of our switch cabinet modules. USB to encoder conversion on request.

SSI-Parallel converter PU10
Converts absolute position and CAM signals from SSI interface to parallel output bits with max. 32 bit.

Switch cabinet module
The perfect aid for transparent rotary encoder cabling. Correct grounding of signal wires and easy connection to our programming adapter.

For linear absolute measurement systems
Double clamping for linear absolute measuring systems in profile housings (magnetostriction: LP) and magnets for linear absolute position measuring system (magnetostriction: LA, LP).

Optical data transfer ID 200
+ optical data transfer
+ range 120m, 200m
+ PROFIBUS / RS 485
+ Interbus-S 500 kBit/s / RS 422
+ Interbus-S 2 MBit/s / LWL

<table>
<thead>
<tr>
<th>Range</th>
<th>0.2 ... 200 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sendediode</td>
<td>infrared light, wave length 880 m</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP 65</td>
</tr>
<tr>
<td>Housing</td>
<td>aluminum die casting light entry / exit glass</td>
</tr>
<tr>
<td>Work temperature</td>
<td>-30 °C ... +70 °C</td>
</tr>
<tr>
<td>Weight</td>
<td>ca. 1200 g</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>18 ... 30 VDC</td>
</tr>
<tr>
<td>Opening angle</td>
<td>± 0.5° to optical axis</td>
</tr>
</tbody>
</table>

Universal display TA-Mini
Is displaying actual values of the SSI measuring system (TR-Electronic and other producers).

Existing SSI connections between measuring system and the controller can be monitored and the position can be shown without influencing the connection.

Is displaying actual values and other parameters of rotary encoder (rotary encoder of TR-Electronic with arbitrary process and programming interfaces). The process interface remains free.

+ comfortable display function
+ scale
+ zero shift
+ decimal, hexadecimal, binary
+ leading zero, prefix…

Programming module
The display itself can be programmed via USB or PC (TRWinProg).

Over the display the measuring system can be programmed (those that are connected to the programming interface). The TA-Mini takes over the function of the PC adapter.

Linked displays
Values shown can be transmitted to other TA-Minis (display at a machine, master display). The scale can be taken over or independently adjusted.

Displaying differences
For each display can be chosen, when having two linked displays with their own SSI measuring system, if one would like to show its own position or the one of the other measuring system or the difference of it.

+ Signal converter
Parameters read in over the programming interface can be displayed as SSI value.

Therefore, you easily can retrofit, for example, a LLB60 Analog with a SSI interface or via programming interface readout speed … that can be send via SSI.

Signal converter
Parameters read in over the programming interface can be displayed as SSI value.

Therefore, you easily can retrofit, for example, a LLB60 Analog with a SSI interface or via programming interface readout speed … that can be send via SSI.

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