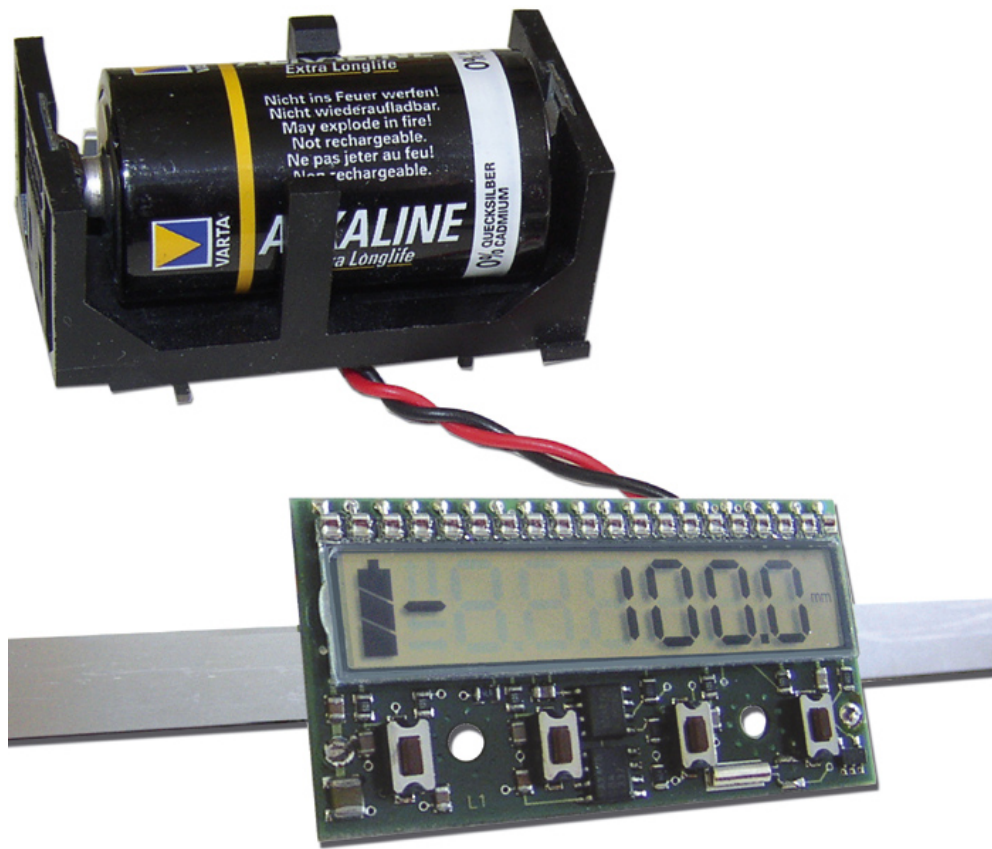


Operation Manual

SERIES Z10-001-N

Battery operated Length Measuring Unit



- space saving and complete system in a low price range
- no connections resp. wirings necessary
- open PCB building method for adaptation to most diverse machine types
- custom specified front design and keypad possible
- direct assembly with the magnetic tape (sensor is integrated)
- 0.1 mm resolution and +/- 0.1 mm repeat accuracy
- adjustable pulse scaling factor and decimal place
- Inch or Millimeters selectable as measuring unit
- external battery case with 1.5 V Battery (Size C)
- battery state and measuring unit visibly in the display
- with a high-quality battery up to 12 months in continuous operation

| | |
|--|-----------|
| 1. General Information..... | 3 |
| 1.1. Information Operation Manual | 3 |
| 1.2. Explanation of Symbols..... | 3 |
| 1.3. Statement of Warranties | 4 |
| 1.4. Demounting and Disposal | 5 |
| 2. Safety | 6 |
| 2.1. General Cause of Risks..... | 6 |
| 2.2. Personal Protective Equipment | 6 |
| 2.3. Conventional Use..... | 7 |
| 3. Transport and Storage | 7 |
| 3.1. Safety Instructions for Transport/Unpacking and Loading | 7 |
| 3.2. Handling of Packaging Material..... | 7 |
| 3.3. Check of Transport | 8 |
| 3.4. Storage | 8 |
| 4. Product Features | 9 |
| 5. Technical Data | 10 |
| 5.1. Dimensions | 10 |
| 5.1.1 Dimensions Indicator with integrated sensor | 10 |
| 5.2. Technical Data | 11 |
| 6. Installation..... | 12 |
| 6.1. Qualifications of the Staff | 12 |
| 6.2. Installation..... | 12 |
| 7. Structure and Function..... | 14 |
| 7.1. Display and Buttons | 14 |
| 7.2. Enter parameters | 15 |
| 7.3. Parameters | 16 |
| 7.4. Accessories | 17 |
| 7.4.1 Magnetic tape | 17 |
| 7.4.2 Processing hint for the sticking of magnetic tapes..... | 18 |
| 8. Interferences..... | 19 |
| 8.1. Security..... | 19 |
| 8.2. Electrical interference suppression | 20 |
| 8.3. Restart after fault clearance | 20 |
| 8.4. EMC information | 21 |
| 9. Maintenance | 21 |
| 9.1. Battery changing..... | 21 |
| 10. Type Designation | 22 |
| 11. Accessories..... | 22 |
| 12. Register..... | 23 |
| 12.1. Index..... | 23 |

1. General Information

1.1. Information Operation Manual

The manual contains important information regarding the handling of the indicator. Precondition for safe operation is the compliance with the specified safety and handling instructions. Moreover, observe the existing local accident prevention regulation and general safety rules.

Please read the operation manual carefully before starting to work. The manual should be kept accessible at anytime. The illustrations in the manual are for better representation of the facts they are not necessarily to scale and can be slightly different to the actual construction.

1.2. Explanation of Symbols

Warning notices

Warning notices are characterised by symbols in the operation manual. The notes will be introduced by signal words to express the magnitude of the danger.

Follow these advices in order to avoid accidents and injuries to persons and property.



DANGER!

... adverts to direct dangerous situations that can lead to death or severe injuries.



CAUTION!

... advices to potentially dangerous situations that can lead to death or severe injuries.



ATTENTION!

... advices to potentially dangerous situations that can lead to damages on property.

Hints and commendations

**ADVERT!**

...highlights helpful hints and recommendations for efficient and failure-free operation.

Specific safety instructions

The following symbols in conjunction with safety instructions are used in order to point out possible hazards:

**DANGER!**

...marks perilous situations by electricity. By non-observance of the safety instructions the possibilities of death or severe injuries exist. The operations have to be carried out only by an electrician.

1.3. Statement of Warranties

The warranty conditions are in a separate document.

Guarantee

The producer guarantees the functional capability of the process engineering and the selected parameter. The period of warranty is one year and begins with the date of delivery.

1.4. Demounting and Disposal

Unless otherwise authorized, dispose the item considering the safety instructions.

Before demounting

- Disconnect the power supply
- Secure against re-start
- Disconnect supply lines physically and discharge remaining energy
- Dispose operating supplies with respect to the environment

Disposal

Recycle the decomposed elements:

- Scrap metal elements
- Recycle plastic parts
- Dispose the rest of the components according to their material consistence



ATTENTION!

Wrong disposal → damage caused to the environment!

Electronic waste, electronic components, lubricants and operating supplies are liable to treatment of hazardous waste.

Only approved specialized companies should perform disposal.

Local authorities and waste management facilities provide information about environmentally suitable disposal.

2. Safety

2.1. General Cause of Risks

This chapter gives an overview about all important safety aspects to guarantee an optimal protection of employees.

Non-observance of the instructions mentioned in this operation manual can result in hazardous situations.

2.2. Personal Protective Equipment

Employees should wear protective clothing during installation of the device to minimize the risk of accidents.

Therefore:

Change into protective clothing before beginning the work process. Also observe any labels in the operating area regarding protective clothing.

Protective clothing



Safety working clothing

- ... is close-fitting
- ... is tear proof
- ... has tight sleeves without distant parts

Also wear no rings, necklaces or other jewellery.



Protective gloves

- ... for protecting the hands against abrasion and cuts

2.3. Conventional Use

The indicator **Z10** is for the limited purpose as described in this manual:

The indicator **Z10** is constructed for measurement uses only.



CAUTION!

Danger through non-conventional use!

Non-intended use and non-observance of this operation manual can lead to dangerous situations.

Therefore:

- Use **Z10** only as described
- Strictly follow this manual

Avoid in particular:

Remodelling, refitting or changing of the device or parts of it with the intention to alter functionality or scope of the position indicator.

ELGO is not liable for any damages resulting from improper use of the product.

3. Transport and Storage

3.1. Safety Instructions for Transport/Unpacking and Loading



ATTENTION!

Professional transport only.

Do not throw, hit or fold the package.

3.2. Handling of Packaging Material

Adverts for proper disposal refer to 1.4.

3.3. Check of Transport

Examine delivery immediately after receiving for completeness and transport damages.

In case of externally recognizable transport damages:

- Do not accept the delivery or do accept under reserve
- Note extent of damages on the transportation documents or on the delivery note
- File complaint immediately

**ADVERT!**

Claim any damages you recognize as soon as possible. The claims for damage must be filed in the lawful reclaim periods.

3.4. Storage

Store device only under following conditions:

- Do not store outside
- Keep dry and dust-free
- Do not expose to aggressive media
- Protect from direct sun light
- Avoid mechanical shocks
- Storage temperature: 20 to + 50 °C
- Relative humidity: 60% non-condensing
- Inspect packages regularly if stored for an extensive period of time (> 3 months)

4. Product Features

The magnetic length measuring system Z10 is a combination of an indicator and a magnet sensor, which are integrated in the display unit and already electrically connected. Therefore no wirings or connections are necessary with the installation.

In standard variant, an external battery case with a 1.5 Volt battery feeds the unit with power. The battery case is connected by a 10 cm long double-core cable to the indicator unit. Other 1.5 V - Battery sizes can be realized on request.

The standard system is supplied in principle as open PCB variant (without housings), in order to make possible an individual adaptation to diverse machine types.

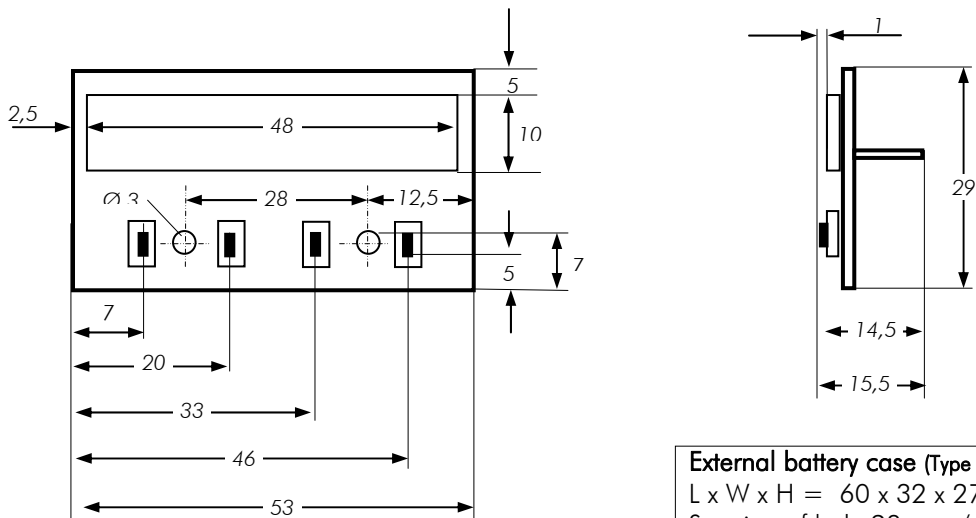
On demand, a customized housing and/or front design can be developed. A special version number (SN number) for a definitely identification or possible re-orders, will be created (see Type designation) then.

5. Technical Data

5.1. Dimensions

5.1.1 Dimensions Indicator with integrated sensor

In standard variant both mounting hole $\varnothing 3$ mm can be used for assembly.
With an internal battery case, the holes are used for fastening the battery case.



External battery case (Type C):
L x W x H = 60 x 32 x 27 mm
Spacing of hole 28 mm / $\varnothing 3$ mm

5.2 Technical Data

Display Z10

| | |
|------------------------------|---|
| LCD-Display | 6 Decades (Digit height 8 mm) Status of Battery and Unit |
| Power supply | 1 x Battery (1,5 V) |
| Battery case | external, length of supply wire = 10 cm |
| Operation temperature | +5 ° up to + 50 ° C |
| Drive speed | max. 2,5 m/sec |
| Housing | open PCB |
| Dimensions of PCB | W x H x D = 53 x 29 x 16 mm |
| External battery case Size C | L x W x H = 60 x 32 x 27 mm |
| Protection class | IP 00 (open PCB) |

Magnetic Sensor MS20.25 (integrated)

| | |
|-----------------------|--------------------------------------|
| Resolution | 0,1mm |
| Protection class | IP00 (open PCB) |
| Operation temperature | +5° up to + 50° C |
| Distance Sensor/Tape | max. 1,0 mm (without cover tape „C“) |

Magnetic Tape MB 20-25-10-1-R

| | |
|------------------------------|--|
| Operation temperature | 0° up to + 50°C |
| Accuracy at 20° C in mm | +/- (0,025 + 0,02 x L) L = effective Measuring length in m |
| Length expansion coefficient | $\alpha = 16 \times 10^{-6} \times 1/K$ |

6. Installation

6.1. Qualifications of the Staff



Improper maintenance
... can lead to serious personal injuries or property damage.

Therefore:
Maintenance work should be referred to qualified and authorized by the operator and instructed personnel.

6.2 Installation

No wires or connections are required for installation. The Z10 system is specially designed for the assembly on manual stop- and slide systems or mechanical guidance's, which there is no cable to be carried on.

For measurement a magnetic tape (ELGO MB 20.25 = 2.5 mm pole distance) which delivers the necessary electrical information (e.g. current position), must be attached alongside to the measuring distance. The sensor must be assembled with a max. distance of 0.8 mm to the tape!

The indicator contains extensive programming functions e.g. scaling factor, decimal places, counting direction, relative measurement, adjustable datum value as well as changeover for mm or INCH operations. The indicator on arbitrary position can be set to zero or any datum position by pressing a front key. With a good mark battery (size C) , the system is able to work up to 12 months in operation.

Please note: These data apply only when using high-quality batteries!

The resolution of the system is 0.1 mm. The max. operation speed amounts to 2.5 m/s.

Please note:

1. Sensor PCB = Center of the tape

Magnetic tape (Top view):

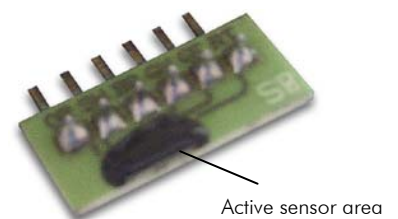
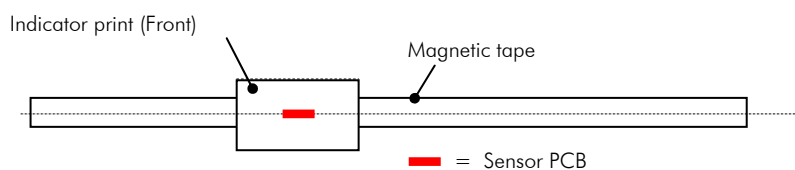
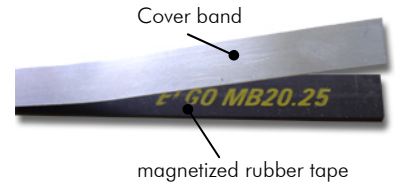
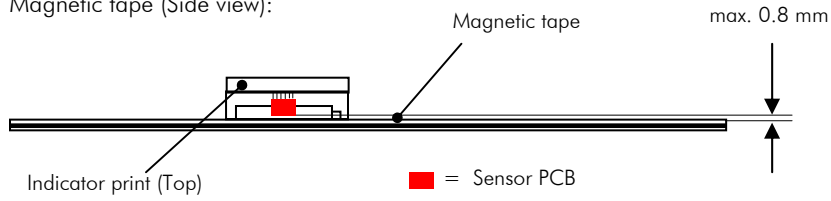


fig. Sensor PCB

2. Distance Sensor \leftrightarrow Tape = max. 0.8 mm's to the cover band (top side)

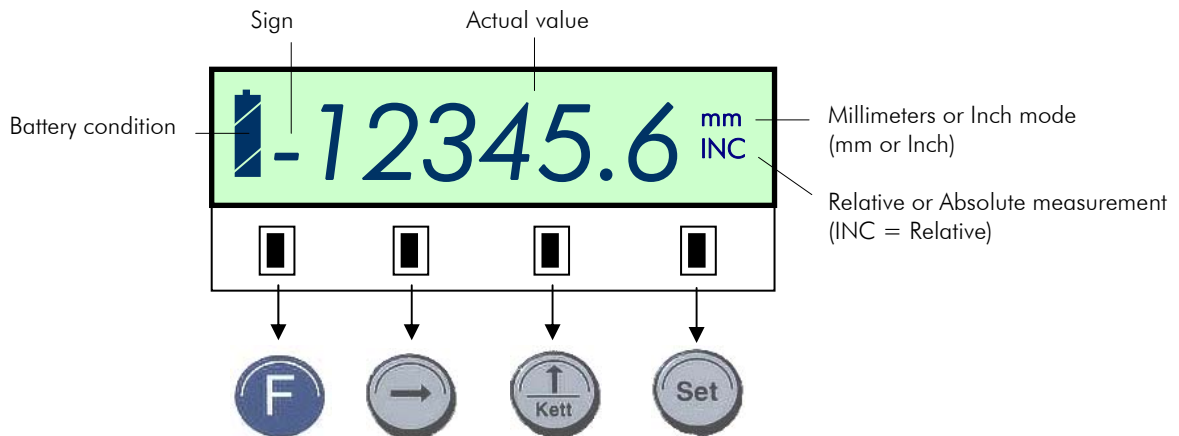
Magnetic tape (Side view):



If no cover band is used, the max. permitted distance increases to 1.0 mm.

7. Structure and Function

7.1 Display and Buttons



Press:



1. To activate the parameter set up mode (press for 3 seconds)
2. To select single parameters and parameter values
3. To quit the adjusted parameter value



To select decades during the parameter settings









1. **Operation mode:** Switches over from **absolute** to **relative** measurement (the actual value resets to zero, the display shows INC)
2. **Set up mode:** During the parameter settings, the selected decade is increased by each pressing



To set the display to the datum value

7.2 Enter parameters

1. Press  for 3 seconds
→ The display shows **P01** (register 01)
2. Press 
→ the pertinent parameter value appears in the window
3. Use  and  to select a decade and enter a desired value
4. Quit the new entered value by pressing 
→ the display jumps to the next register (**P05**).
Repeat the procedures **2.** - **4.** with the next registers
5. Press  for 3 seconds → the actual value appears again

7.3 Parameters

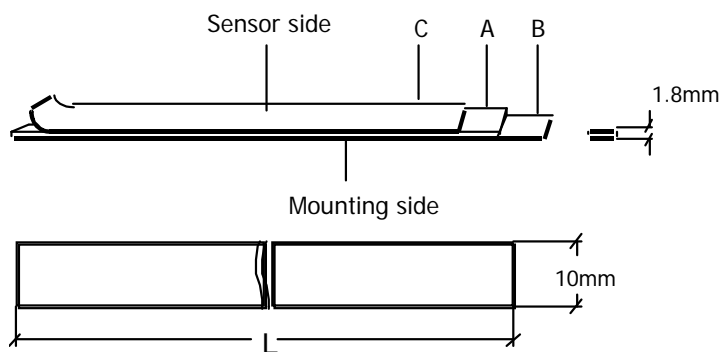
| Parameter | Description | Default Parameters |
|-----------|---|--------------------|
| P01: AB | mm / inch Switching A = 0: mm – Mode A = 1: Inch – Mode (Resolution 0,001 Inch) Counting direction: B = 0: positive B = 1: negative | 01 |
| P03: A | Decimal point (0 ... 3) | 1 |
| P05: AB | Key lock: A: Button „ SET “ (0 = active / 1 = not active) B: Button „ Incr / Abs „ (0 = active / 1 = not active) | 00 |
| P08: | Multiplication factor (0,0001 ... 9,9999) | 1,0000 |
| P09: | Reference value(-999999,9 ... + 999999,9) | 0,0 |
| P99: | Displays the Firmware – Version | X.XX |

7.4 Accessories

7.4.1 Magnetic tape

The magnetic tape MB20.25

The ELGO magnetic tape consists of three components:



Deliverable lengths 0.5 – 32 m, other lengths on request

- A) The magnetized, highly flexible rubber tape, connected on the bottom with:
- B) A magnetized, flexible steel tape. This steel tape protects the rubber tape from mechanical damages and is at the same time a magnetic short circuit. This increases significantly the functional security under extreme magnetic influences. **A** and **B** are already factory-bonded.
- C) To keep the flexibility for transport and installation, the third part the cover band, also a steel tape (magnetic permeable), is delivered separately. It serves for mechanical protection of the rubber tape and should be stuck on the magnetic rubber tape after installation.

7.4.2 Processing hint for the sticking of magnetic tapes

Materials to stick:

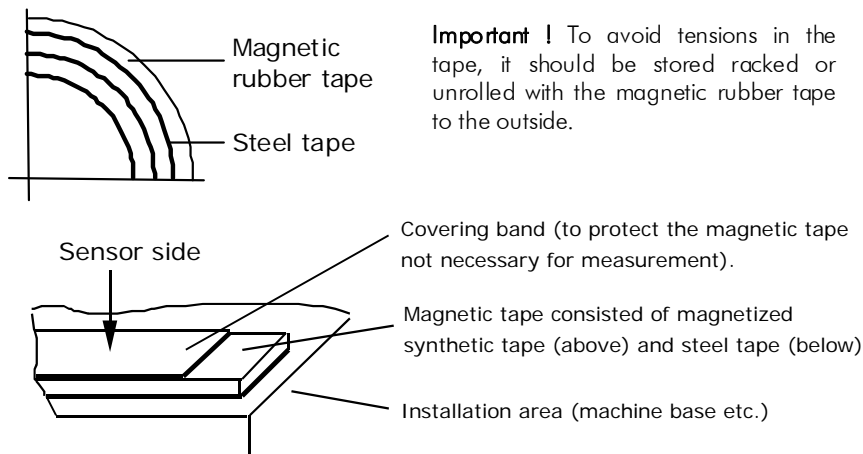
The provided sticky tapes stick well on clean, dry and plain surfaces. Typical solvent for cleaning surfaces are a 50/50 mixed isopropyl-alcohol / water mixture or heptane. (Important: Please observe carefully the caution hints of the producer when using the solvent.) The surfaces of materials as copper, brass etc. should be sealed to avoid an oxidation.

Proof:

The stability of the adhesion is directly depending on the contact, which the adhesive develops to the stick together surfaces. A high proof results in a good surface contact.

Sticking temperature:

The optimal sticking temperature is between + 21°C and 38°C. Avoid colder sticking surfaces than + 10°C, because in this case the adhesive becomes too hard and perhaps a sufficient immediate adhesion is hardly to achieve. After proper sticking the stability of the connection is ensured also when the temperature is below zero. The final tackiness of a sticking is from experience reached after approximately 72 hours (at + 21°C).



Resistance to chemicals of the magnetic tape

Chemicals, showing no or only a small effect:

- | | | | |
|------------------|----------------|--------------|-------------------|
| -formic acid | -glycerol 93°C | -linseed oil | -soy beans oil |
| -cotton seed oil | -N-hexane | -lactic acid | -formaldehyde 40% |
| -iso octane | -petroleum | | |

Chemicals, showing small to medium effect:

- | | | | |
|--------------------|------------------|------------------|--------------------|
| -acetone | -gasoline | -acetic acid 30% | -olean acid |
| -acetylene | -steam | -acetic acid | -sea water |
| -ammonia anhydrous | -acetic acid 20% | -isopropyl ether | -stearic acid 70°C |
| | | -kerosene | |

Chemicals, showing strong effect:

- | | | | |
|------------------|------------------------------|-----------------------|------------------|
| -benzene | -nitric acid 70% | -turpentine | -toluene |
| -lacquer solvent | -nitric acid, red, vitriolic | -carbon tetrachloride | -trichloroethane |
| -nitrobenzene | -hydrochloric acid 37% | -tetrahydrofuran | -xylene |

Cleaning the tape: In order to receive the type marking, we recommend, to clean the rubber tape with a damp cloth only.

8 Interferences

The following chapters describe possible causes for malfunction and the instructions to correct them. If you encounter problems check for proper installation first. Make sure that power is supplied to the system. If you observe recurring errors you might consider electrical interference suppression measures as described in section 7. If errors cannot be corrected with the following instructions please contact the manufacturer (see last page).

8.1 Security

Basics



CAUTION!
Risks of injury from improper fault clearances!

Improper fault clearances can cause serious personal or property damage.
Therefore:

- Fault clearance may only be carried out by qualified and instructed personnel
- Prior to the beginning of work provide sufficient room to assemble the equipment
- Please look for cleanliness at the place of installation; loosely around laying parts and tools are sources of accidents

If components have to be replaced:

- Look for correct installation of spare parts
- All mounting elements have to be assembled correctly
- Before resetting please ensure that all covers and protective devices are installed correctly and function properly

To ensure a perfect operation of the indicator the following (external) measures have to be taken additionally:

Place of installation:

The indicator should not be installed near to sources of interference generating strong inductive or capacitive interferences or strong electrostatic fields. Install the external power supply directly beside the indicator to avoid long low voltage wires.

8.2 Electrical interference suppression



Signal wires should be installed separately from load power lines and with a safe distance of at least 0.5 m to capacitive and inductive interferences such as contactors, relays, motors, switching power supplies, timed controllers.

If interferences occur in spite of applying all above mentioned measures proceed as follows:

1. Add RC elements over contactor coils of AC contactors (for example 0,1 μ F/100 Ω)
 2. Add recovery diodes over DC inductances
 3. Add RC elements over each drive phase (in connector box of the drive).
 4. Do not connect the GND potential with PE (earth potential)!
- Install a power filter before the external power supply

8.3 Restart after fault clearance

After fault clearance:

1. Reset emergency stop switch.
2. Quit disturbance on indicator.
3. Make sure that no person is located in the danger zone.
4. Start operating as explained in the instructions.

8.4 EMC information

A trouble-free operation of the control devices of the company ELGO Electric GmbH can only be guaranteed if in assembly, wiring and operating the following basic rules are observed and adhered to:

- use only shielded signal lines with a minimum diameter of 0.15 mm²
- to protect against electrical fields, connect the cable shield unilaterally, low resistance and low inductive with the operating lightning protection.
- unused arteries in signal lines should be isolated from each other separately
- isolate signal and power lines separately in long parallel lines (a distance of 300 mm is respected) therefore, should never be different voltage levels, e.g. 230V/50 Hz power supply and measuring signal 24V DC in one cable together
- low the emission by the Installation of filter networks in plants with frequency. In the operating instructions of the manufacturer FU find the appropriate instructions.
- wireless phones and Walky-talkies should never be used in the immediate vicinity of electronic devices

9 Maintenance

9.1 Battery changing

Depending upon order, the battery box is accessible internally or externally.

What happens with the stored data? Except of the actual value, all data and parameter will remain with the battery change.

Hint: Use a high-quality mark battery only, in order to achieve the service life, indicated by us. When using cheap batteries we cannot ensure this life span.

Battery size C (1.5 VDC)

(only available with an external battery case)

Service life app. 12 months*

The max. length of the powers supply wires = 10 cm's

Other battery types and cases on request.

*) Only when using high quality batteries!



10 Type Designation

Z10 - 000 - 001 - N

Series (Type)

Z16

SN-Nummer

000 = Standard

001 = 1st special version

Supply

001 = 1,5 V Battery

Options

N = without housing

11 Accessories

MB20-25-10-1-R

Magnetic tape MB 20-25-10-1-R:

Series

MB20 = incremental Magnetic tape

Pole pitching

25 = 2,5 mm

Band Width

10 = 10 mm

Tracks

1 = One track system

Tape construction

R = Standard: Magnetic tape on inference material

12 Register

12.1 Index

| | |
|-----------------------------|----|
| D | |
| Demounting | 5 |
| Dimensions | 10 |
| Disposal..... | 5 |
| E | |
| Enter the parameter | 15 |
| G | |
| Guarantee | 4 |
| I | |
| Interferences..... | 19 |
| L | |
| O | |
| Operation manual..... | 3 |
| M | |
| Maintenance | 21 |
| P | |
| Parameter | 16 |
| Protection clothing..... | 6 |
| Purpose of Use | 7 |
| S | |
| Security..... | 6 |
| Storage..... | 8 |
| Suppress interferences..... | 20 |
| Symbols | 3 |
| T | |
| Technical Data | 10 |
| Transport | 8 |
| Type Designation..... | 22 |

