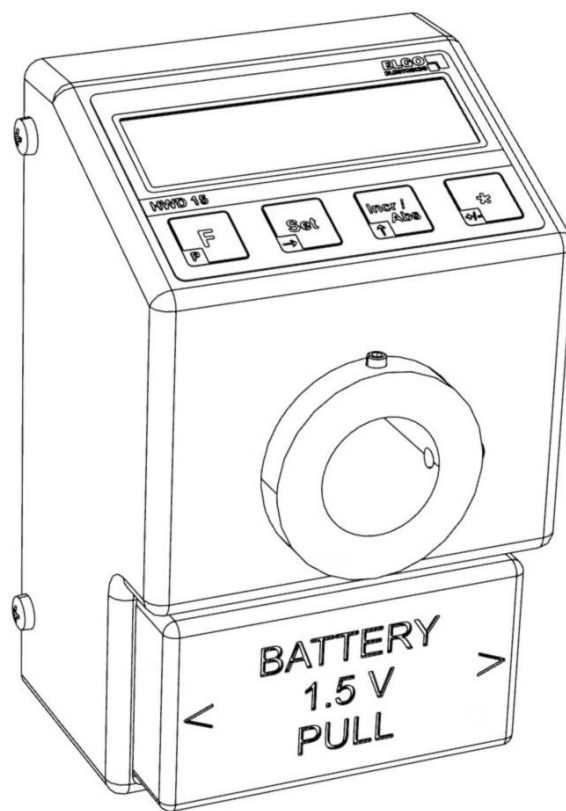


# Operation Manual

## SERIES HWD15 MKII

Battery powered Length Measuring System and Indicator System  
for rotative movements (0.01 mm resolution)



- Easy mounting and operation
- Contactless measuring principle
- With signs and special signs
- Battery status indicator
- „°“-Symbol for angle measuring are possible
- Fraction display in inch mode possible
- Resolution up to 0.01 mm
- Display inch mode „0.001 Inch“ is possible
- Tool offset, function, incremental measurement

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## 1 General

### 1.1 Information Operation Manual

The manual contains important information regarding the handling of the indicator.  
For Your own safety please note all safety warnings and instructions.

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 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.

Warning notices:

	<b>DANGER!</b> This symbol in connection with the signal word „Danger“ indicates an immediate danger for the life and health of persons. Failure to heed these instructions can result in serious damage to health and even fatal injury.
	<b>WARNING!</b> This symbol in connection with the signal word „Warning“ indicates a possible danger to the life and health of persons. Failure to heed these instructions can result in serious damage to health and even fatal injury.
	<b>ATTENTION!</b> This symbol in connection with the signal word „Caution“ indicates a possibly dangerous situation. Failure to heed these instructions can lead to minor injury or property damage.

**Special safety instructions:****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.

**Tips and recommendations:****Note!**

Here you can see Highlights, useful tips, information and recommendations for efficient and trouble-free operation.

### 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 parameters. 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
- Electronic components in electronic scrap
- 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

	<p><b>NOTE</b></p> <p>Please read the operation manual carefully before using the device! Observe the installation instructions! In case of damage caused by failure of these operating instructions the warranty expires.</p> <p>ELGO Electronic GmbH &amp; Co. KG and its subsidiaries are not liable for any damage to persons, property or asset caused by defective material on the device and / or it's associated. We take no responsibility for consequential damage!</p> <p>The operator is obliged to appropriate security-related measures and implement.</p> <p>The Commissioning may only be performed by qualified and by the operator authorized and trained personnel.</p>
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### 2.1 General Cause of Risks

This chapter gives an overview about all important safety aspects to guarantee an optimal protection of employees. (See at chapter 8).

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:

	<p><b>Safety working clothing</b></p> <p>... is close-fitting ... is tear proof ... has tight sleeves without distant parts</p> <p><b>Also wear no rings, necklaces or other jewellery.</b></p>
	<p><b>Protective gloves</b></p> <p>... for protecting the hands against abrasion and cuts.</p>

### 2.3 Conventional Use

The device only is for the limited purpose as described in this manual:

The HWD15 MKII ELGO length measurement system is constructed for measuring and displaying distances.



#### CAUTION!

Danger through non-conventional use!

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

Therefore:

- Use **HWD15 MKII** 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.  
The Operator is liable for all damages during non-conventional use.

### 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 Fehler! Verweisquelle konnte nicht gefunden werden..

#### 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: 10 to + 60 °C (see technical data, chapter 6)
- Relative humidity: 80 % non-condensing (see technical data, chapter 6)
- Inspect packages regularly if stored for an extensive period of time (> 3 months)

## 4 Product Features

The battery-operated measurement system provides a hollow shaft (diameter 20 mm) and is directly attached to the spindle. The position is detected by the integrated sensor and displayed on the LCD display.

The housing enables a robust back board and flange possibility including torque support makes the HWD 15. Although HWD 15 is a robust measuring system, the mechanical stresses, however, should be taken up by the spindle. The hollow shaft rotates in slide bearing.

The extensive basic functions and parameters allow a wide range of applications. Especially the simple pulse rate adjustment is advantageously (standard 1250 / U). The device provides a common battery cell (good quality). So the system operates within 12 months of continuous operation.

**ADVERT**

In the power-off mode the movements or adjustments of the magnetic sensor are not covered!

A reference has to be conducted after the start of operation (at a required mechanical position, the indicator is to set e.g. ZERO)

**ADVERT**

The resolution of the measurement system is 0.01 mm!

All settings of the multiplication factor refer to this resolution!

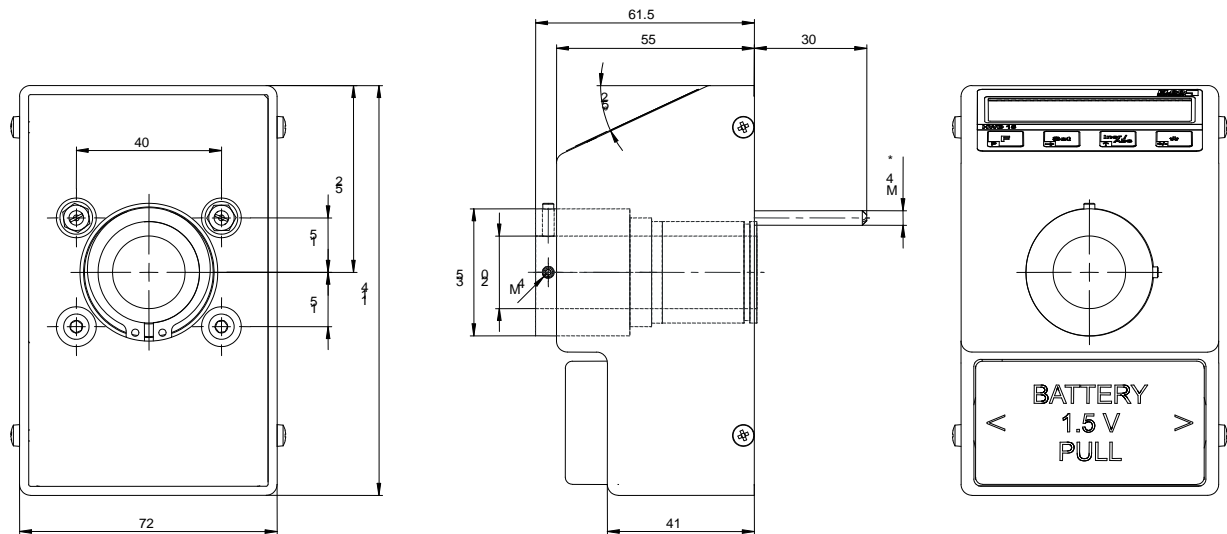
## 5 Application

- Manual and motor adjustments
- Valve adjustments
- Wrapping fixtures
- Detection of values for manual operation



## 6 Technical Data

### 6.1.1 Measurements HWD15 MKII



### 6.1.2 Technical Data HWD15 MKII

#### Indicator Device HWD15 MKII

LCD-Indicator	7 decades for counting (digit height 9 mm) with sign, battery status and dimension unit
Dimension unit	mm, m, Inch or °
Angle of view	12 o'clock
Keyboard	foil with keys
Measuring principle	magnetic, quasi- absolute
Measuring method	rotative
Power Consumption	< 1 mA (at 1.5 V)
Durability of battery	about 12 month (depending on battery type)
Operating temperature	0°C ... + 50°C
Storage temperature	0°C ... + 70°C
Humidity	Max. 80 %, non condensing
Operating speed	Max. 2.5 m/s
Speed	Max. 1500 u/min
Protecting class	IP43 (installed)
Housing dimensions	B x H x T = 72 x 114 x 61.5 mm
Hollow shaft aperture	20 mm
Storage of arbor	Slide bearing
Axial-strain	Max. 20 N
Radial-strain	Max. 200 N

### 6.1.3 Power Supply / Battery Change

**ADVERT**

For a long operating time, the use of commercially branded batteries is recommended.

If all the battery icons on the LCD-Display are extinguished (see also section **Fehler! Verweisquelle konnte nicht gefunden werden.**), a battery change should be made as soon as possible.

By changing the batteries strictly observe the polarity, take for orientation the markings on the battery-case!

All data and parameters are obtained at the battery change, apart from the current actual value.

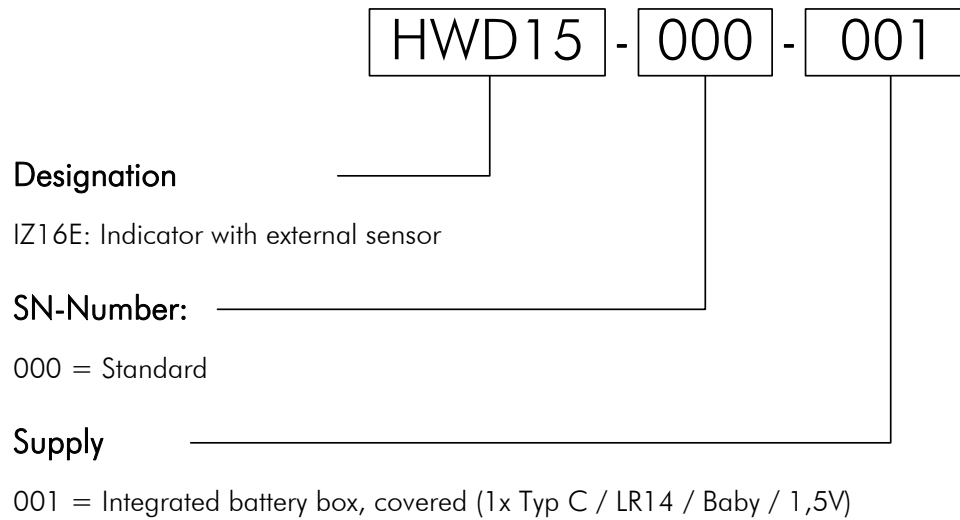
The included high quality battery allows the HWD15 MKII permanent continuous operation up to 12 months. The battery status is displayed on the LCD display.

Remain at a required battery change (apart from the current actual value), all data and parameters.


On front page, beneath the hollow shaft, is the battery box, which can be opened without tools by gently squeezing and pulling out of hand. Please insert the eighth of the battery on the polarity mark (+).




## 7 Type Key Device







## 8 Installation and Commissioning

	<p><b>ADVERT</b></p> <p>Please read the operating instructions carefully before using this device! Installation instructions must be observed! In case of damage caused by failure observing the installation instructions, the warranty will be invalidated.</p> <p>The ELGO Electronic GmbH &amp; Co. KG and the subsidiaries are not liable for injury to persons, property or financial loss, which can be caused by faulty material on the device and / or incurred by the related components. We assume no liability for damages!</p> <p>The operator is obliged to take appropriate security measures and implement them.</p> <p>The commissioning should only be performed by qualified and authorized personnel.</p>
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### 8.1 Operating Area

	<p><b>WARNING!</b></p> <p>Do not use the device in explosive or corrosive environments!</p>
---	---

	<p><b>CAUTION!</b></p> <p>The electrical connections are made by suitably qualified personnel in accordance with local regulations.</p>
	<p>The device is designed for switchboard mounting. During the work on the switchboard, all components must be free of tension if the danger exists, that energized parts can be touched. (Finger protection)</p>
	<p>Wiring may only be energized!</p> <p>Thin wire cable strands are equipped with ferrule!</p>
	<p>Before switching on all ports and connectors are to be reviewed!</p> <p>The device must be mounted that it is protected against harmful environmental influences such as splashing water, solvent, vibration, shock and severe pollution and also the operating temperature is to maintain.</p>

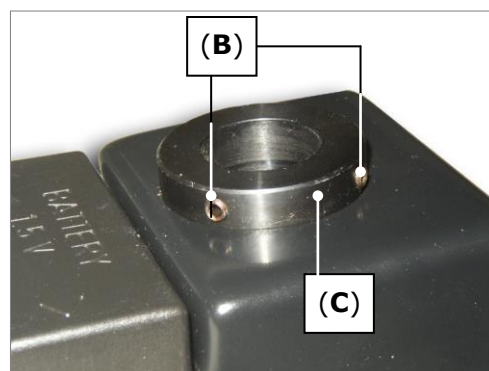
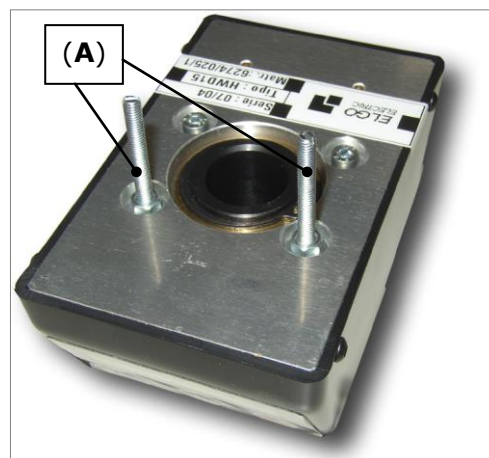
## 8.2 Interferences

If errors cannot be corrected with the following instructions please contact the manufacturer (see last page).

	<p><b>NOTE</b> Device, connection cables and signal cables must not be installed directly next to interference, which have strong inductive or capacitive interference or strong electrostatic fields!</p> <p>External interference can be avoided by a suitable cable routing.</p>
	<p>Signal wires and cables are principally laid separately from the LASTSTROMLEITUNG and keep a safety distance of at least 0,5m to inductive or capacitive interference sources such as contactors, relays, motors, switching power supplies, clocked controllers, etc.!</p> <p>If faults occur despite of compliance of all the described items above, it must proceed as follows:</p> <ol style="list-style-type: none"><li>1. Attachment of RC elements of contactor coils of AC contactors (e.g. 0.1 <math>\mu</math>F / 100<math>\Omega</math>)</li><li>2. Attachment of free-wheeling diodes using DC inductors</li><li>3. Attachment of RC elements of individual motor phases (in the terminal box of the engine)</li><li>4. Do not connect safety ground and reference potential</li><li>5. Pre-connecting a mains filter on the external power supply</li><li>6. Use of sheet metal or metalized shielding housings</li></ol>

### 8.3 Mounting and Measurement

1. Fix the HWD 15 to the shaft that the two 30 mm long M4 stud bolts (A) are suitable for the prepared fixing holes (hole distance 40 mm) will fit.
2. Fix HWD 15 on the shaft by tightening the two with 2 mm Allen (B) provided set screws which side of the hollow shaft body (C) are attached accordingly.
3. Fix the concluded M4 fixing studs (A) with corresponding nuts.



### 8.4 Adjustment of Arbor

Calculate the correct pulse multiplication factor corresponding to the screw pitch as follows:

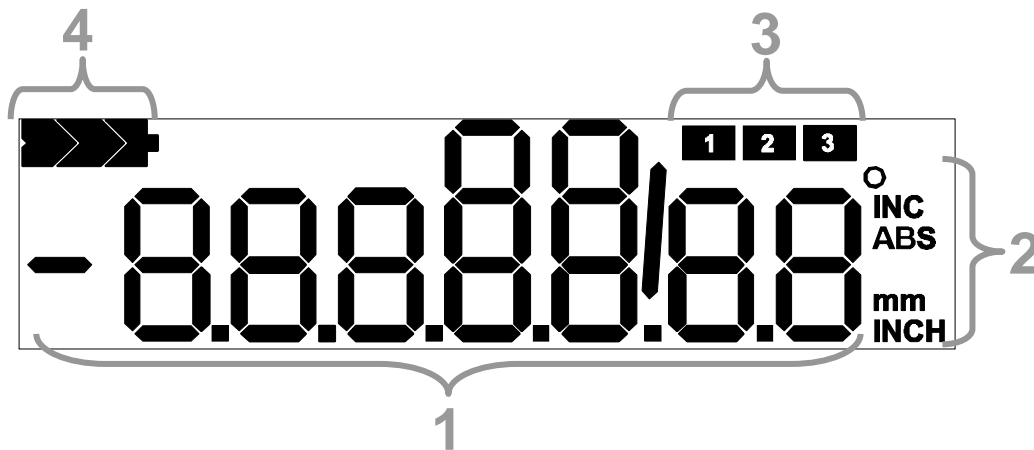
**Spindelsteigung/1250**

**Example at 5 mm pitch:  $50/1250 = 0.04$**

**Enter the calculated factor to parameter No. 8**

## 8.5 Overview Display

The following display icons or segments of the LCD-display are used in this software version:



1	Segments for numeric and text display (including signs, decimal points, fraction display)
2	Symbols for units and display mode
3	Icons for active tool-offsets 1 ... 3
4	Battery-Status Icons





For different applications the symbol may be changed for the unit by parameter (*P02*), e.g. the „°“ - symbol for angle measurement (see section 8.7.6).



The standardization of the indicator value must be done manually with the corresponding multiplication factor (*P08*) and the decimal point (*P03*) (see section 8.7.6).

In the Inch-mode an additional fraction display is available.

## 8.6 Overview Keys

The function of the keys in the parameter level is shown on the button in the dark box on the left below the function at the operating level is shown in the bright field size:

Key	Function operating area (see Fehler! Verweisquelle konnte nicht gefunden werden.)	Function parameter level (see Fehler! Verweisquelle konnte nicht gefunden werden.)
	Base-key for keyboard combination	Activate / deactivate parameter level
	Fraction display in the Inch mode	Next digit (decades) select
	Activate/ deactivate Incremental Measurement	Increase value by 1
	Activate/ deactivate Tool offsets	Sign change

Key	Function at the initialization level (see.8.8
	If the device is activated the calibration is triggered
	If the device is activated the parameters are reset to factory settings and causes a calibration



## 8.7 Parameter Level

→ Adjustments of operating parameter

### 8.7.1 Activate Parameter Level



Hold it for about 3 seconds / then press each 1x

The parameter level is activated with this key. After about 3 seconds the display shows „P01“ for the first parameter. When the button is actuated again, the corresponding parameter value is displayed, which can then be changed. With the help of this all parameters are successfully selected.

### 8.7.2 Election of Decade



1x pressed

With this key the decade will be advanced by a passage from left to right. The selected, changeable decade is flashing on the display.

### 8.7.3 Change Value



1x pressed

With this key the value in the selected decade is always increased by 1 (0...9 or 0/1)

### 8.7.4 Change Sign



With this key the sign can be changed for some parameters. (Negative sign is only possible if the value is not ZERO)

### 8.7.5 Leave Parameter Level



Press it for about 3 seconds in the parameter level

All parameters will be retentively stored in the internal flash memory when leaving the parameter level.


### 8.7.6 Parameter list

Parameter:	Description:	Default:
P01: A	System configuration: A = 0: Counting positively A = 1: Counting negatively	0
P02: A	Indikator display (betrifft nur die Anzeige- Symbole!): A = 0: mm-mode / indicator symbol „ mm “ A = 1: Inch-mode / indicator symbol „ Inch “ A = 2: mm-mode / indicator symbol „ m “ A = 3: mm-mode / indicator symbol „ ° “ A = 4: mm-mode / there is no symbol	0
P03: A	Decimal point ( 0 ... 4 ) → only for mm-Mode	2
P05: ABC	Key lock: A: Button „Set“ (0= activated / 1= deactivated) B: Button „Incr/Abs“ (0= activated / 1= deactivated) C: Button „*“ (0= activated / 1= deactivated)	000
P07: A	Resolution: (starting with Firmware V1.50) A = 0: Resolution 0,01 mm A = 1: Resolution 0,1mm	0
P08:	Multiplication factor ( 0,0001 ... 9,9999 )	1,0000
P09:	Reference value ( -9999999 ... +9999999 )	0
P10:	Offset 1 ( -9999999 ... +9999999 )	0
P11:	Offset 2 ( -9999999 ... +9999999 )	0
P12:	Offset 3 ( -9999999 ... +9999999 )	0
P13: A	Configuration Offset (0...3) A = 0: offset cannot be activated A = 1: offset cannot be activated A = 2: offset 1 & 2 can be activated A = 3: offset 1 & 2 & 3 can be activated	3
P90:	(without function)	0
P99:	Indicator in the company version	x.xx

## 8.8 Initialization Level

→ Resetting of parameter & calibration

### 8.8.1 Calibration

	<p><b>ADVERT</b> The calibration is already factory-made and must not run again normally.</p> <p>In a few cases a re-calibration of the device after the installation can achieve an advancement of the accuracy, because with a re-calibration the additional mounting factors (angular deviation, parallelism, etc.) are included.</p> <p>Caution: The magnetic sensor must be in the maximum distance range on the tape during the calibration.</p>
---	--

⇒ Switch off the device (remove battery or remove plug)




Keep pressing the key

⇒ While pressing the key the device is turning on again

The sensor calibration is initiated and „CAL 0“ is displayed. The sensor now has to be moved slowly in a direction on the magnetic tape, the process of the calibration is shown by the display „CAL 1 ... CAL 4“. After finishing the calibration the device will start automatically in the operator level.

### 8.8.2 Load the Default Parameters and simultaneous Calibration

	<p><b>ADVERT</b> Already changed parameters will be overwritten by the default parameter! If it is necessary write down the setting before.</p>
---	---

⇒ Switch off the device (remove battery)



Keep pressing the key

⇒ While pressing the key the device is turning on again

All parameters are reset to factory settings. Furthermore the sensor calibration is triggered.

➔ Approach see on chapter 8.8.1

## 8.9 Function of Operator Level

→ Working with the device

### 8.9.1 Set actual value to reference



Keys 1x press at the same time

With this shortcut, the actual value (display value) on the adjustable reference value is set (in absolute mode only possible when the offset is not enabled).

The reference value can be entered with the parameter **P09**.

### 8.9.2 Direct entry from value to reference

(Function is possible at firmware 1.30)



Press both keys for about 3 seconds at the same time

With this key combination, the value to reference **P09** can be entered without switching into the parameter level. (See on chapter 8.7)

→ After pressing the keys for approximately 3 seconds, the display shows the text "P09".

If the keys are released the value to reference **P09** appears, and this value can also be changed in the parameter level.



Key 1x press to save the value to reference

### 8.9.3 Switching incremental or absolute



1x pressed

With this key the indicator is switched from absolute mode to incremental mode:

→ The display value is temporarily set to ZERO, the symbol „INC“ appears in the display.

Actuating the key again the absolute is activated and the symbol "ABS" is displayed.

### 8.9.4 Activation Offset Measurements



1x pressed

This key enables/disables each of the three adjustable offset dimensions (only possible in the absolute mode). In each case an offset is added to the display value.

The activation of an offset level is indicated by the symbols **1**, **2** or **3**.

The offset measurements can be entered in the parameter **P10**, **P11** and **P12**.

Additionally, parameters can be determined with **P10**, **P11** and **P12**, whether and how many offset measurements can be selected.

### 8.9.5 Fraction Display in Inch Mode



This key allows switching into inch-mode (parameter P02=1) as follows:

1x key pressed	:	Display Inch- fraction display	1/64 Inch
2x key pressed	:	Display Inch- fraction display	1/32 Inch
3x key pressed	:	Display Inch- fraction display	1/16 Inch
4x key pressed	:	Inch Decimal Display	0.001 Inch
Etc.			

## 9 Interferences

The following chapters describe possible causes for malfunction and the instructions to correct them.

### 9.1 Safety



#### WARNING!

Risk of injury by improper disposal!

Improper disposal can lead to severe disturbance to persons or property.

Therefore:

- Any work to rectify the fault may be performed only by qualified and adequately instructed personnel
- Before starting to work ensure sufficient space of mounting
- Paying attention to orderliness and to cleanliness at the mounting area, loose parts and tools, which are lying on each other or lying around, are sources of accidents

If components need to be replaced:

- Pay attention of proper mounting of the spare parts
- Install all fasteners correctly again
- Before restarting ensure that all covers and guards are properly installed and working correctly

### 9.2 Restart after fault clearance

Once you resolve the failure:

1. Where appropriate, reset the emergency stop device
2. Where appropriate reset the fault message to the parent system
3. Ensure that there are no persons in the danger zone
4. Proceed in accordance with the instruction of section 8

## 10 Maintenance

The device is maintenance-free.

**WARNING!**

Hazard due to improper maintenance!

Improper maintenance can result to serious personal injury or property damage.

Therefore:

Maintenance work must be performed only by qualified and authorized by the operator and instructed personnel.

## 11 Cleaning

**WARNING!**

The system should be cleaned with damp cloth, do not use aggressive cleaning products.

**ADVERT**

The surface of the magnetic tape can be cleaned with string contamination by dust, shavings, humidity, etc. occasionally with a soft cloth.

With a strong pollution of the magnetic tape by magnetic metal shavings measurement errors or malfunctions are possible.

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### 13 Document History

Rev.	Date	Author	Change
0	31.05.12	RG	Document new created
1	19.03.15	CD	Parameter list completed (multiplication factor)

