

**LIF 982W  
Montageanleitung**

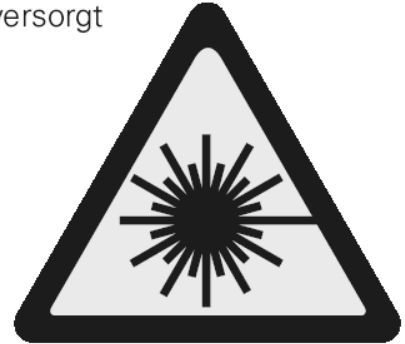
**These mounting instructions are valid for the scanning head LIF 98W (ID 1184920-xx) and the scale 902W (ID 658739-01)**

**Warnings**

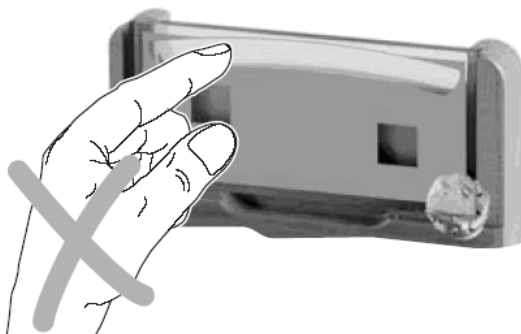
**AK LIF 9xW**

Klasse 3R: bei nicht angebauten AK LIF 9x W, mit Spannung versorgt  
*Class 3R: When AK 9x W is not mounted and is under power*

Klasse 1: bei korrekten Anbau des AK LIF 9xW  
*Class 1: When the AK LIF 9x W is properly mounted*

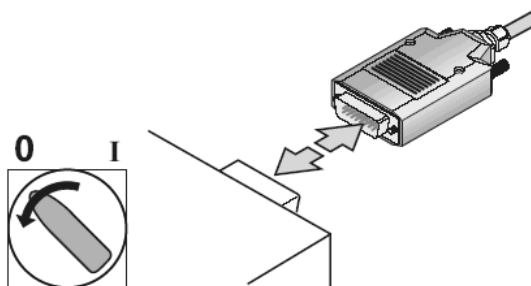


Invisible laser radiation  
Avoid direct exposure to beam  
Laser class 3R  
SEE INSTRUCTION BELOW  
IEC 60825-1:1993+A2:2001  
P < 4mW      λ = 850 nm

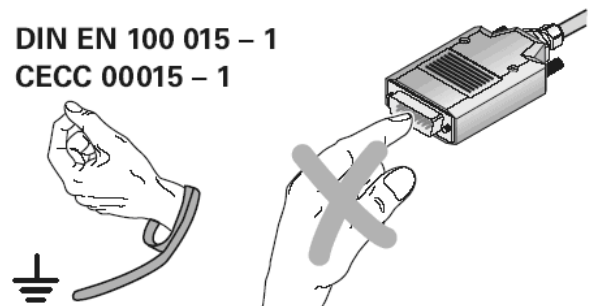


**Teilung nicht berühren!**  
**Do not touch the graduation!**


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**DIN EN 100 015 – 1**  
**CECC 00015 – 1**



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## Items Supplied



Figure 1: LIF 98W scanning head covered in shielding bag

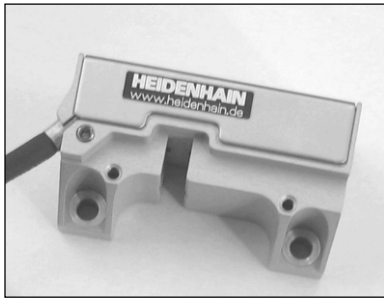


Figure 2: LIF 98W scanning head (ID 1184920-xx)



Figure 3: LIF 902W scale (ID 658739-01)



Figure 4: LIF 9x2 mounting aid

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## Mounting the Scale

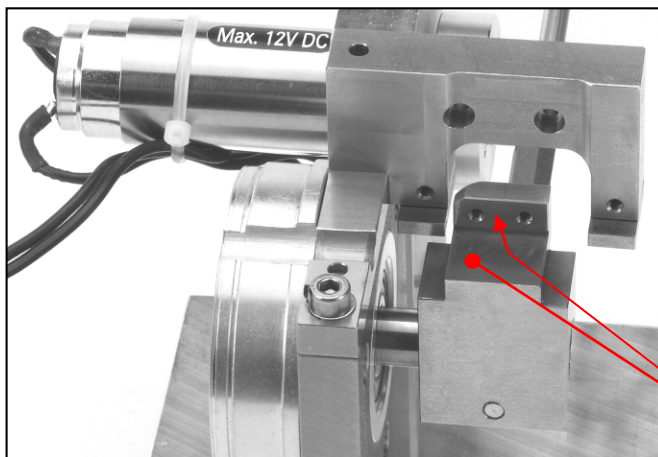
Remove the scale from the packaging as shown in Figure 5.



Figure 5: Removing the scale

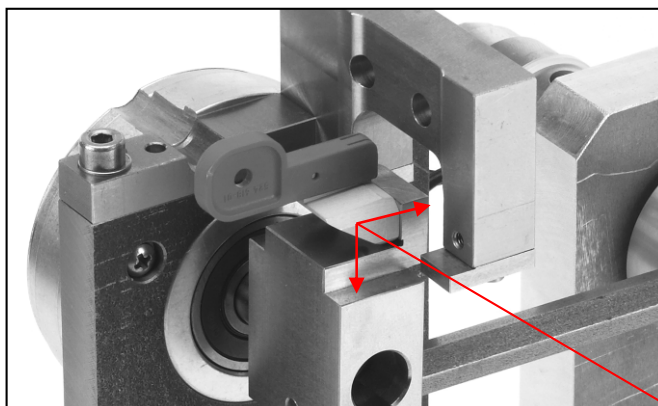
Ensure that the red protective clip remains on the scale. Under no circumstances, never touch the graduation with your fingers (danger of contamination).

In order to align the scale (figures 6 and 7), the top surface and a side surface of the scale holder both serve as supports.



Support surfaces for the scale

Figure 6: Support surfaces for the scale



Alignments for the scale

Figure 7: Aligning the scale



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Four screws (DIN EN ISO 4762 M2 x 6) are recommended for securing the scale.  
(Maximum tightening torque: 0.32 Nm).

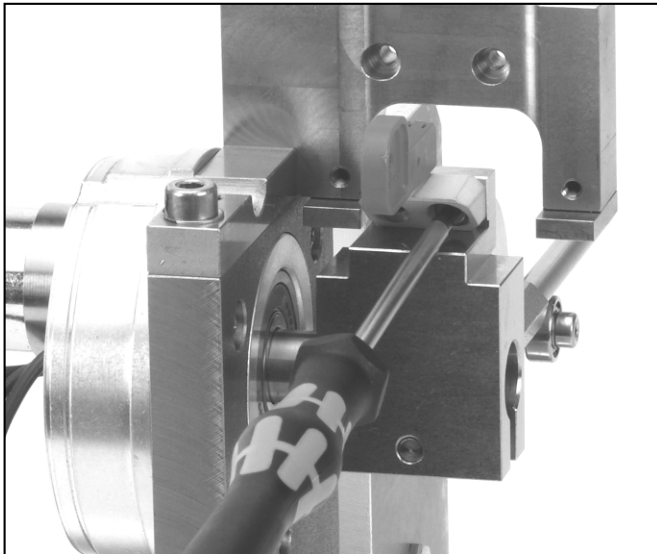


Figure 8: Securing the scale

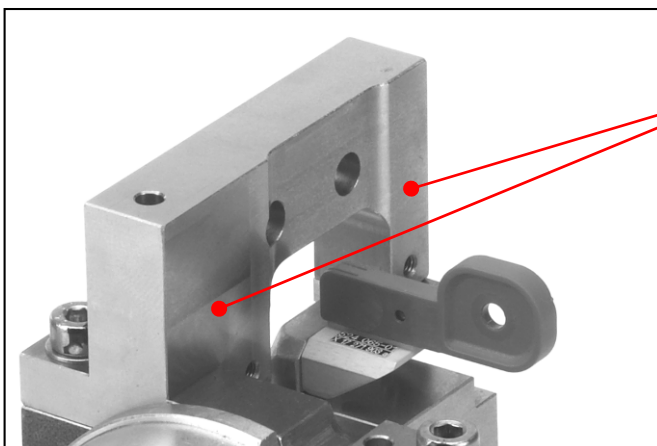
### Mounting the Scanning Head

Take the scanning head out of the shielding bag



Figure 9: Scanning head with shielding bag

Align the scanning head with the support surface.



Support surface

Figure 10: Support surface for the scanning head

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Put the head at its approximate position while the protective cover still remains on the scale. Secure the head loosely in order to allow adjustment. Two screws (DIN EN ISO 4762 M2.5 x 20) and two washers (DIN EN ISO 7092 2.5) are recommended for securing the scanning head.

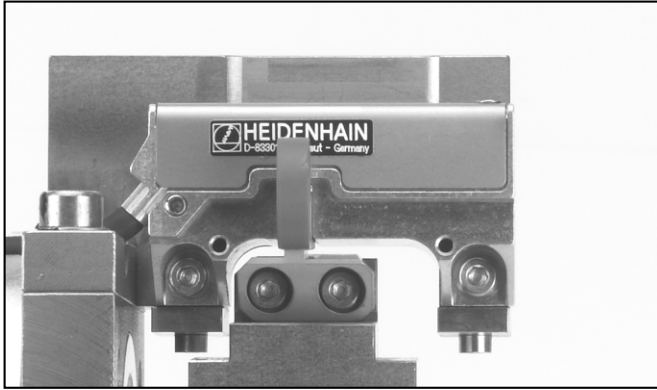


Figure 11: Pre-positioned scanning head

Remove the protective clip.

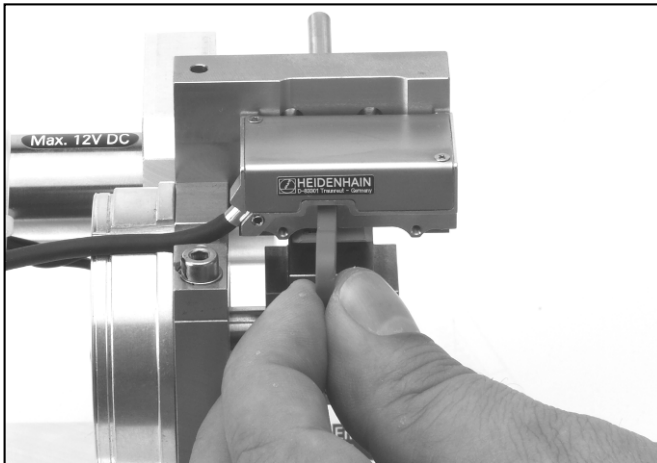


Figure 12: Removal of the protective clip

Set the scanning gap and the distance to the rotation center of the LIF 982 with the mounting aid. Ensure that the mounting aid is positioned correctly (Figures 13 and 14) and the scale is rotated into mounting position as shown in dimension drawing (2.8° tilted to scanning head base)

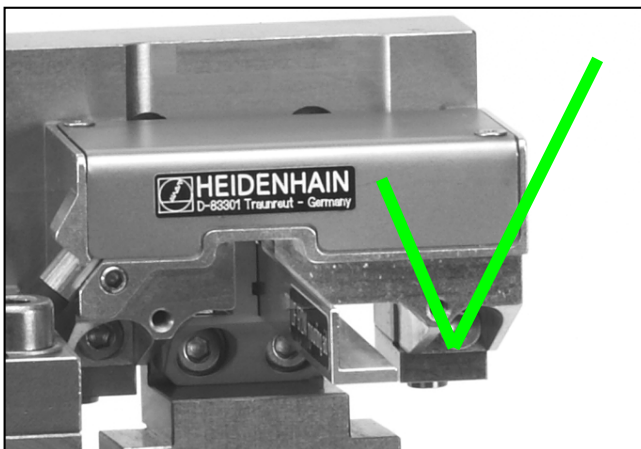


Figure 13: Correct position LIF 9x2 mounting aid

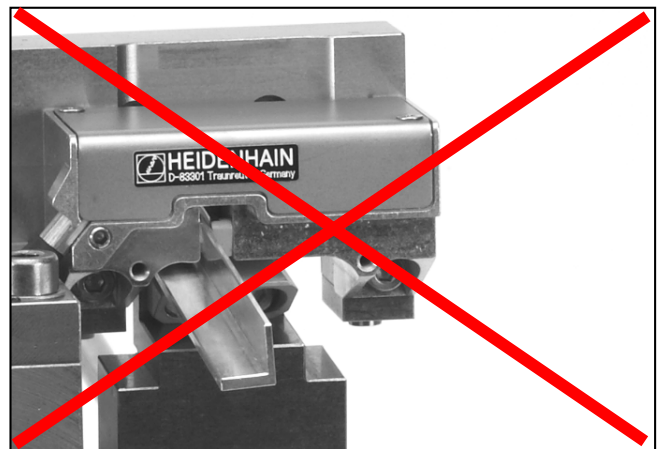


Figure 14: Incorrect position of the mounting aid

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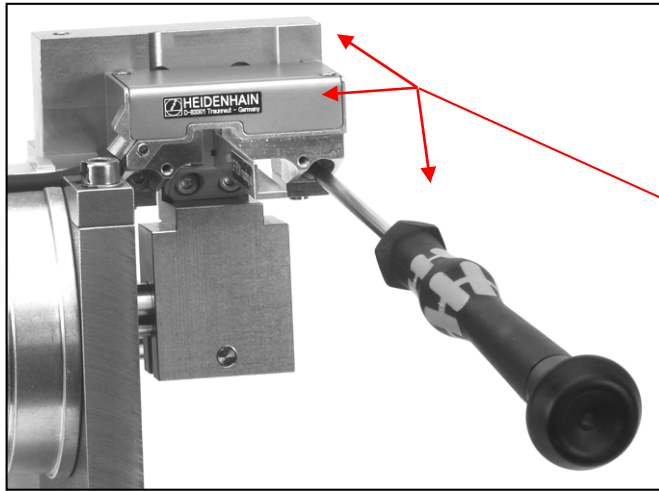


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Press the scanning head to the support alignments and tighten the mounting screws. (Maximum tightening torque: 0.65 Nm).



Support alignments for the scanning head

Figure 15: Securing the scanning head

It must be easy to remove the LIF 9x2 mounting aid from the scanning gap after the scanning head has been mounted.

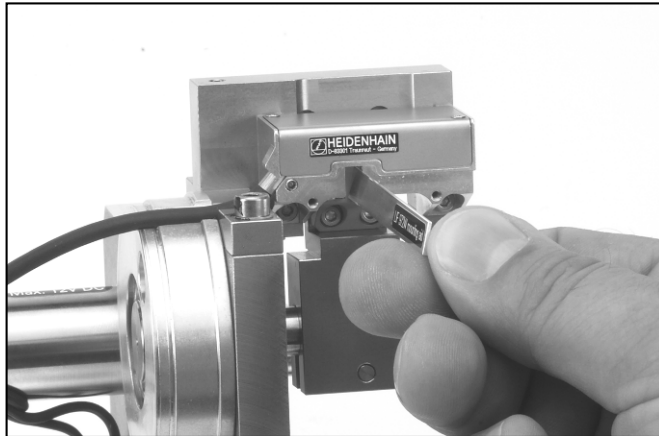


Figure 16: Removal of the mounting aid

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## Adjusting the Output Signals

A PWM8 phase-angle measuring unit from HEIDENHAIN (Id. Nr. 309 956-xx), for example, along with a connecting cable (Id. Nr. 331 693-xx) and oscilloscope, is suited for adjusting the output signals.

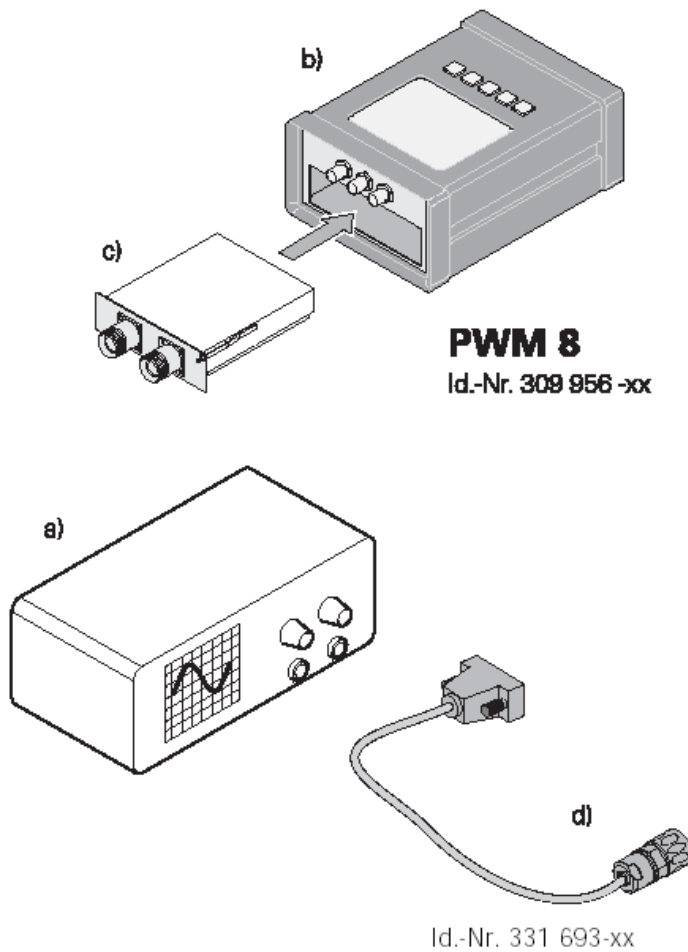


Figure 17: Accessories for adjustment

Remove the protective cap on the plug of the adapter connector, and remove the cover.

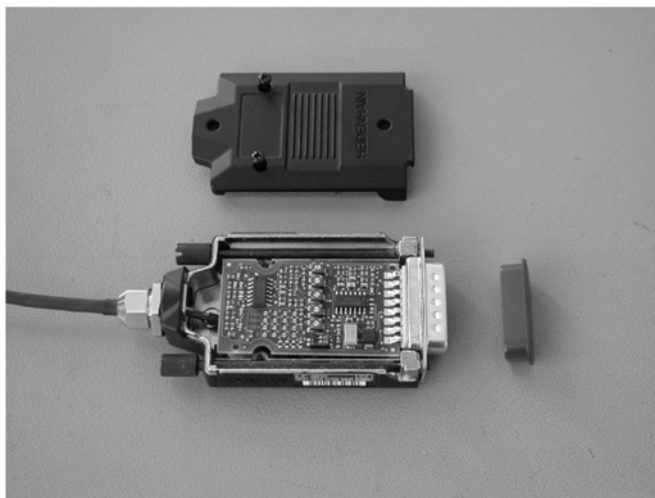


Figure 18: Opened adapter connector



Use the adapter cable (331 693-xx) to connect the LIF 982W to the PWM8, and the BNC outputs of the PWM with the oscilloscope.

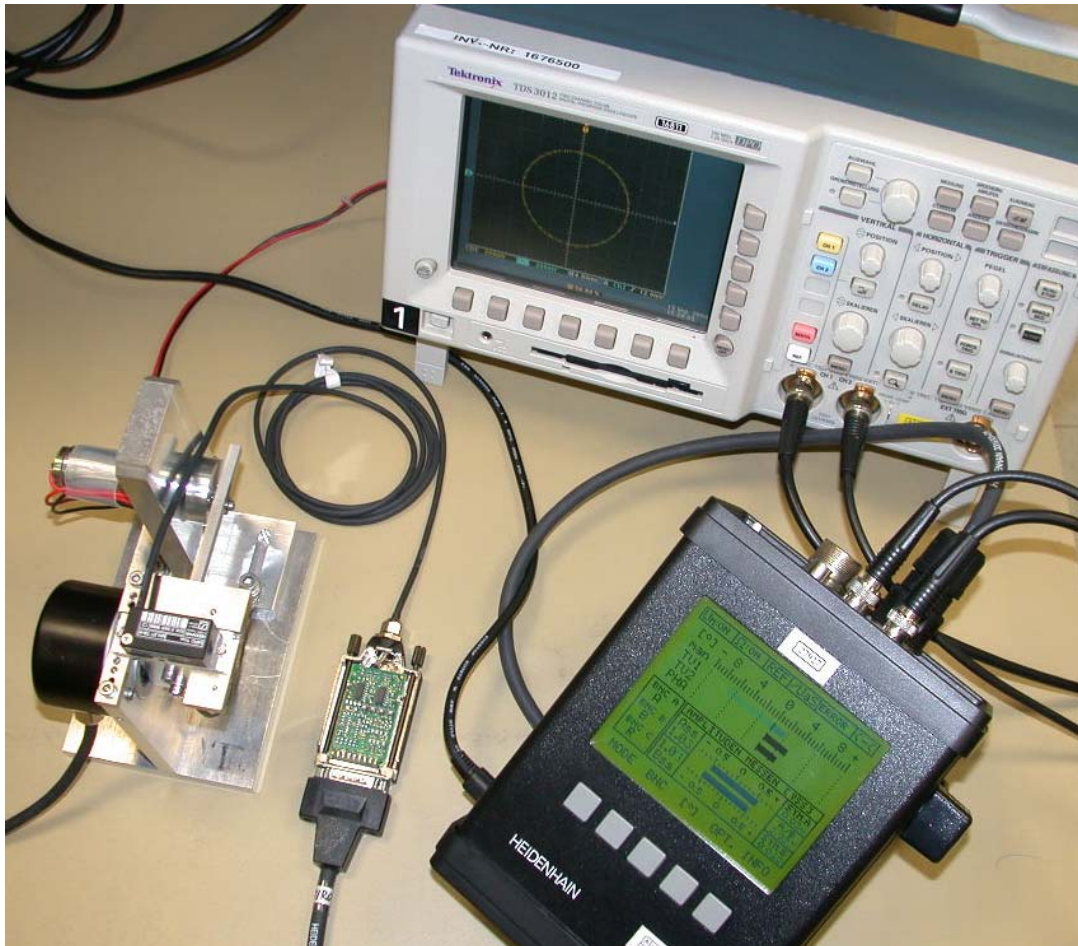


Figure 19: Adjustment setup

The PWM8 displays the signals as shown below.

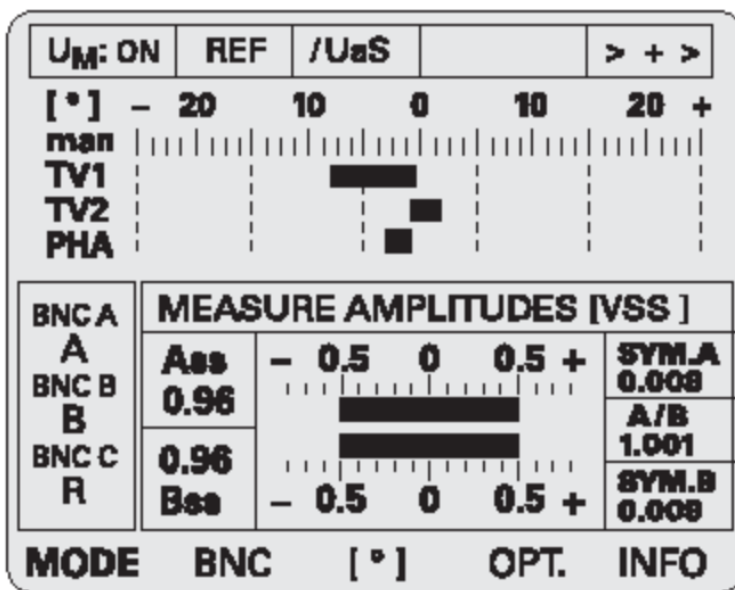


Figure 20: Display of the signals on the PWM8





The signals can also be displayed on the oscilloscope as follows:

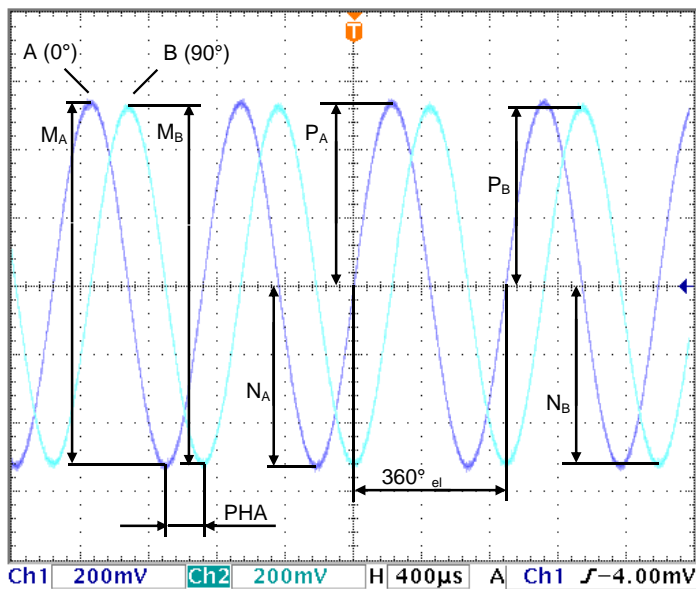


Figure 21: Incremental signal display on the oscilloscope

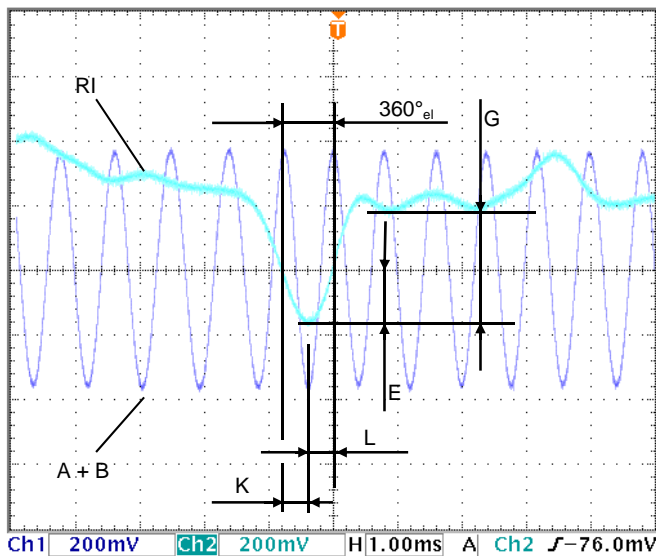


Figure 22: Reference signal display on the oscilloscope

Five potentiometers and one DIP-switch are available on the adapter connector for adjusting the signals.

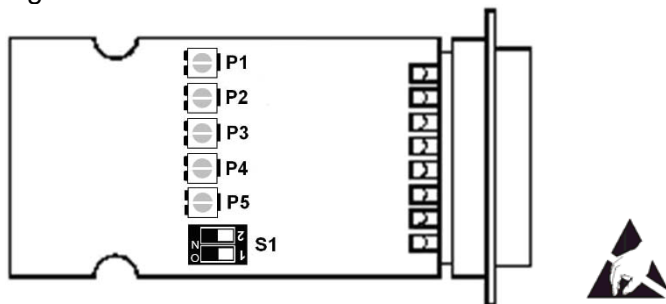



Figure 23: APE PCB with potentiometers

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The following values are to be checked and/or set:

Signal values	Initial operation	Fine adjustment	Typical values* <sup>1)</sup>	
Signal levels $M_A, M_B$ ( $0^\circ, 90^\circ$ )* <sup>2)</sup>	0.8 ... 1.2 $V_{pp}$	Not possible	0.6 ... 1.2 $V_{pp}$	
Amplitude ratio $M_A / M_B$	0.8 ... 1.25	0.95 ... 1.05	0.95 ... 1.05	<b>P5</b>
Phase angle PHA	$90^\circ \pm 10^\circ$	$90^\circ \pm 5^\circ$	$90^\circ \pm 3^\circ$	<b>P4</b>
On-off ratio $TV_A$ and $TV_B$ $TV = 2 \arcsin ( P - N  / M)$	$0^\circ \pm 15^\circ$	$0^\circ \pm 5^\circ$	$0^\circ \pm 3^\circ$	<b>P2</b> * <sup>3)</sup> <b>P3</b> * <sup>3)</sup>
Usable component G	0.2 ... 0.85 $V_{pp}$	0.2 ... 0.85 $V_{pp}$	0.2 ... 0.85 $V_{pp}$	
Switching threshold E	0.2·G ... 0.7·G	0.2·G ... 0.7·G	0.2·G ... 0.7·G	
Zero crossovers K, L	$180^\circ \pm 90^\circ$ el.	$180^\circ \pm 45^\circ$ el.	$180^\circ \pm 45^\circ$ el.	<b>P1</b>
(K-L) / 2	< $90^\circ$	< $60^\circ$	< $60^\circ$	<b>S1</b> * <sup>3)</sup>

\*<sup>1)</sup> Typically, these values can be achieved by accurate mechanical mounting and fine adjustment by potentiometers and DIP-switch. The values are valid up to 20% of the -3dB cut-off frequency in permissible ranges of temperature, supply voltage and, mounting tolerances.

\*<sup>2)</sup> Recommended signal level for lower fault detection limit 0.3  $V_{pp}$  / upper fault detection limit 1.35  $V_{pp}$

\*<sup>3)</sup> S1 is shifting the reference signal position in  $90^\circ$  steps. In consideration of the tolerance of the Ref. signal, this allows to adjust the value  $|(K-L) / 2| < 60^\circ$ . Depending on the setting of S1, the Ref. signal is shifted and the allocation of  $TV_1$  and  $TV_2$  to P2 and P3 is as follows:

S1 setting				
Ref. signal shift	0°	-90°	+90°	180°
$TV_x / P_x$ allocation	$TV_1 = P2$ $TV_2 = P3$	$TV_1 = P3$ $TV_2 = P2$	$TV_1 = P3$ $TV_2 = P2$	$TV_1 = P2$ $TV_2 = P3$

When reassembling the adapter connector, ensure that no cable wires are crimped.

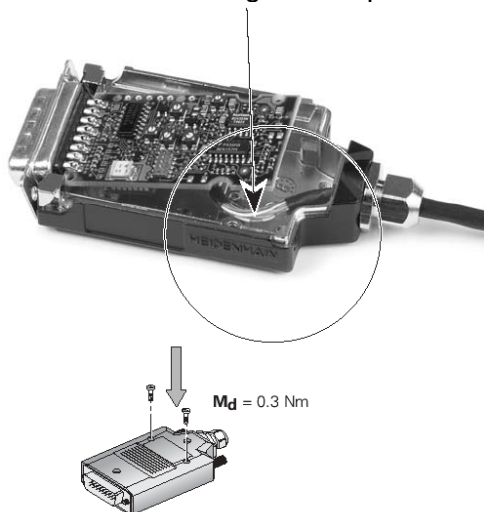
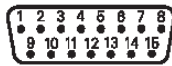
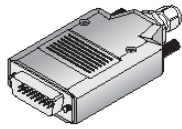


Figure 24: Assembly of the connector

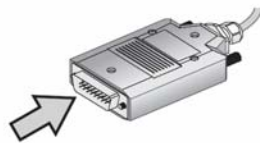
## Electrical Connection



1	9	3	11	14	7	4	2	12	10	8	6	13	15
A		B		R		5 V U <sub>p</sub>	0 V U <sub>N</sub>	5 V sensor	0 V sensor	/	/	/	/
+	-	+	-	+	-								
braun brown brun marrone marrón	grün green vert verde verde	grau gray gris grigio gris	rosa pink rose rosa rosa	rot red rouge rosso rojo	schwarz black noir nero negro	braun/grün brown/green brun/vert marrone/verde marron/verde	weiß/grün white/green blanc/vert bianco/verde blanco/verde	blau blue bleu azzurro azul	weiß white blanc bianco blanco	grün/schwarz green/black vert/noir verde/nero verde/negro	gelb/schwarz yellow/black jaune/noir giallo/nero amarillo/negro	violett violet violet viola violeta	gelb yellow jaune giallo amarillo

## Electrical Data

### Power supply



U<sub>p</sub> = 5 V ± 5 %

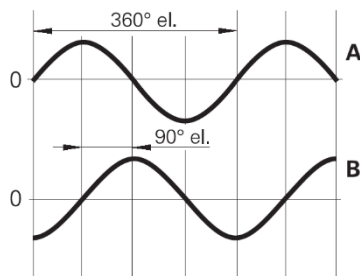


**A: 0.6 ... 1.2 V<sub>SS</sub>**  
**B: 0.6 ... 1.2 V<sub>SS</sub>**



EN 50 178/4.98; 5.2.9.5  
IEC 364-4-41: 1992; 411(PELV/SELV)  
(siehe, see, voir, vedi, véase  
HEIDENHAIN D 231 929)

### Output signals



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## Cleaning

You must always ensure that the encoder is protected from contamination during both mounting and operation. If the encoder must be cleaned, the following must be kept in mind:

There are no optical components inside the scanning head that can be accessed from the outside. The graduated scale is exposed in its holder, meaning that it might become necessary to clean the scale. Dust particles should not be wiped off, but rather blown off with dry, oil-free pressurized air. An ultrasonic bath is recommended for removing organic contaminations (e.g., fingerprints). Good cleaning results can be achieved in a cleaning bath with demineralized water and dishwashing detergent available off the shelf, at approx. 40 °C (104 °F) and 35 kHz.




Figure 24: Ultrasonic cleaning bath

The parts should be placed in a basket and completely submerged in the cleaning liquid, as shown in figure below. The glass must not come into contact with other parts during cleaning, since it might become damaged.



Figure 25: Scale in a basket in the ultrasonic cleaning bath

A treatment of approx. three minutes is recommended. The scale should then be rinsed with demineralized water and be blown dry with dry, oil-free pressurized air.

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