

# WA

## Inductive Standard Displacement Transducers

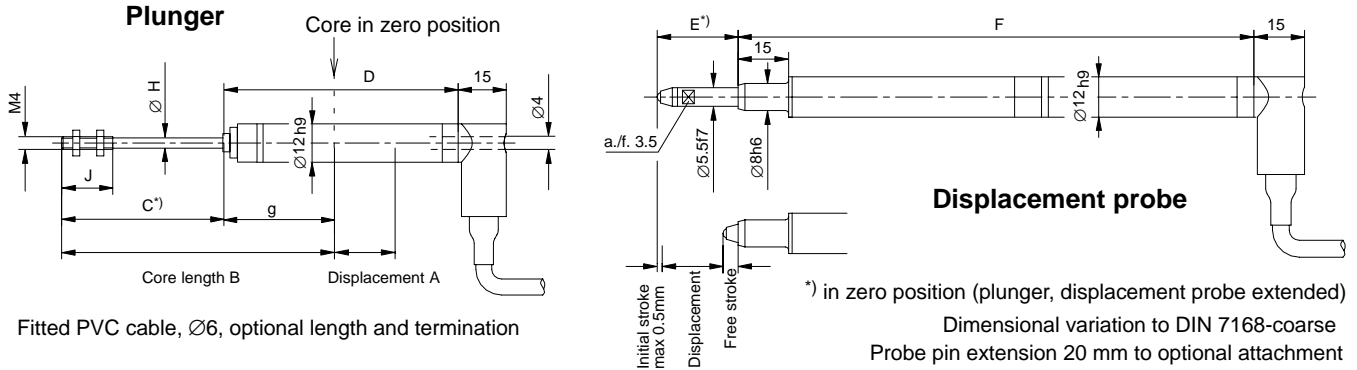
Displacement probe



### Special features

- Displacement probe and transducer with detachable plunger
- Good thermal stability in the event of temperature gradients
- Space-saving, compact design
- Pressure-resistant transducer for measuring displacement in hydraulic cylinders
- Acceleration resistance ensures long service life
- Option: high temperature version up to 150 °C
- Output signal of your choice: 10 mV/V, 80 mV/V, 0.5–10 V

### Dimensions (in mm; 1 mm= 0.0397 inches)



Fitted PVC cable, Ø6, optional length and termination

Measuring range	Plunger							Displacement probe		
	A	B	C	D	G	ØH	J	A	E	F
0...2 mm	2	75.5	40	69	35.5	1.2	15	2	14	130
0...10 mm	10	66	40	69	26 ± 0.5	3.7	16	10	14	130
0...20 mm	20	87	55	84	32 ± 0.5	3.7	16	20	24	170
0...50 mm	50	117	85	114	32 ± 0.5	3.7	16	50	54	230
0...100 mm	100	180	134	181.6	46 ± 10	3.7	16	100	104	372.6
0...200 mm	200	280	234	281.6	46 ± 10	3.7	16			
0...300 mm	300	380	334	381.6	46 ± 10	3.7	16			
0...500 mm	500	580	534	581.8	46 ± 10	3.7	16			

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## Specifications

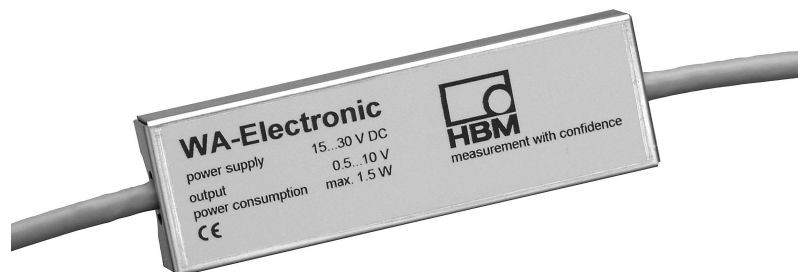
Type		WA2	WA10	WA20	WA50	WA100	WA200	WA300	WA500
<b>Nominal displacement</b>	mm	0...2	0...10	0...20	0...50	0...100	0...200	0...300	0...500
<b>Nominal sensitivity</b> Nominal output signal at nominal displacement with output unloaded	mV/V	80							
<b>Characteristic tolerance</b> Deviation of sensitivity from nominal sensitivity	%	±1							
<b>Zero point tolerance</b> with core in zero position	mV/V	±1		±8					
<b>Linearity deviation</b> Greatest deviation between start and end point (including hysteresis by reference to nominal sensitivity)	%	≤ ±0.2 to ≤ ±0.1							
<b>Nominal temperature range</b>	°C	-20...+80							
<b>Operating temperature range</b>									
Standard	°C	-40...+80							
Variant for high temperature	°C	-40...+150							
<b>Effect of temperature</b> on zero signal in nominal temp. range per 10 K, by refer. to nominal sensitivity	%	< ±0.1							
<b>Effect of temperature</b> on output signal in nominal temp. range per 10 K, by refer. to actual value	%	< ±0.1							
<b>Input resistance</b>	Ω	100 ± 10 %		350 ± 10 %					
<b>Output resistance</b>	Ω	570 ± 10 %		680 ± 10 %					
<b>Nominal excitation voltage</b>	V <sub>rms</sub>	2.5							
<b>Operating range of the excitation voltage</b>	V <sub>rms</sub>	0.5...10							
<b>Carrier frequency,</b>									
Nominal range	kHz	4.8 ± 1 %							
Operating range	kHz	4.8 ± 8 %							
<b>Weight</b>									
of transducer body	g	54	56	57	68	104	147	190	276
of plunger	g	4	6	7	9	13	20	28	42
<b>Surface materials</b>	-	rust-resistant							
<b>Impact resistance</b> , test severity level to DIN IEC 68, Part 2-27; IEC 68-2-27-1987									
Number of impacts (per direction)	-	1000							
Impact acceleration	m/s <sup>2</sup>	650							
Impact duration	ms	3							
Impact form	-	Half sine wave							
<b>Vibration resistance</b> , test severity level to DIN IEC 68, Part 2-6, IEC 68-2-6-1982									
Frequency range	Hz	5 to 65							
Vibration acceleration	m/s <sup>2</sup>	150							
Stress duration (per direction)	h	0.5							
<b>Max. number of stress cycles</b>		10 million						-	
<b>Spring constant</b>	N/mm	0.116				0.063		-	
<b>Spring force in zero position (for 1mm initial stroke) approx.</b>	N	2.4				2		-	
<b>Spring force in final position (nom. displ.) approx.</b>	N	2.7	3.6	4.7	8.2	8.3	-		
<b>Max. permissible probe tip acceleration</b>	m/s <sup>2</sup>	170		140	95	45	-		
<b>Max. permissible plunger acceleration</b>	m/s <sup>2</sup>	2500							
<b>Probe tip cut-off frequency for 1 mm stroke approx.</b>	Hz	60		55	45	30	-		
<b>Probe tip cut-off frequency at nominal displacem.</b>	Hz	18		10	5	3	-		
<b>Degree of protection acc. to EN 60 529</b> for transducer duct and core channel	-	IP67 (depending on connection piece)							
<b>Max. permissible pressure</b> (increasing load)	bar	350							
<b>Overload limit</b> (to VDI/VDE 2600, Sheet 4)	bar	450							
<b>Destructive range</b> (to VDI/VDE 2600, Sheet 4)	bar	> 500							

## Specifications WA electronics

Type		WA2	WA10	WA20	WA50	WA100	WA200	WA300	WA500
Nominal displacement	mm	0...2	0...10	0...20	0...50	0...100	0...200	0...300	0...500
Nominal output span <sup>1)</sup>	V	9.5 (0.5...10)							
Output span tolerance <sup>1)</sup>	%	0.5							
Linearity deviation <sup>1)</sup> Greatest deviation between start and end point (including hysteresis by reference to nominal sensitivity)	%	± 0.2							
Nominal temperature range	°C	-20...+60							
Operating temperature range	°C	-20...+70							
Effect of temperature <sup>1)</sup> on zero signal in nominal temperature range per 10 K, by reference to nominal sensitivity	%	≤ ± 0.15; typically < ± 0.10							
Effect of temperature <sup>1)</sup> on output signal in nominal temperature range per 10 K, by reference to actual value	%	≤ ± 0.15; typically < ± 0.10							
Supply voltage	V	15...30							
Dependence on supply voltage, typically	%	0.03							
Burden in the output	kΩ	≥ 10							
Current consumption	mA	45 (typically 26)							
Power consumption max.	W	1.5							
Cut-off frequency	Hz	520 filter 4th order, Butterworth							
Cable length between the transducer and the electronics	m	3...20							
Cable length between the electronics and the evaluator	m	3...50							

<sup>1)</sup> specified for the complete measuring chain

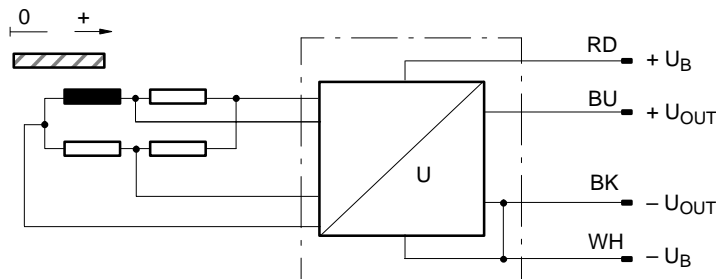
## WA electronics



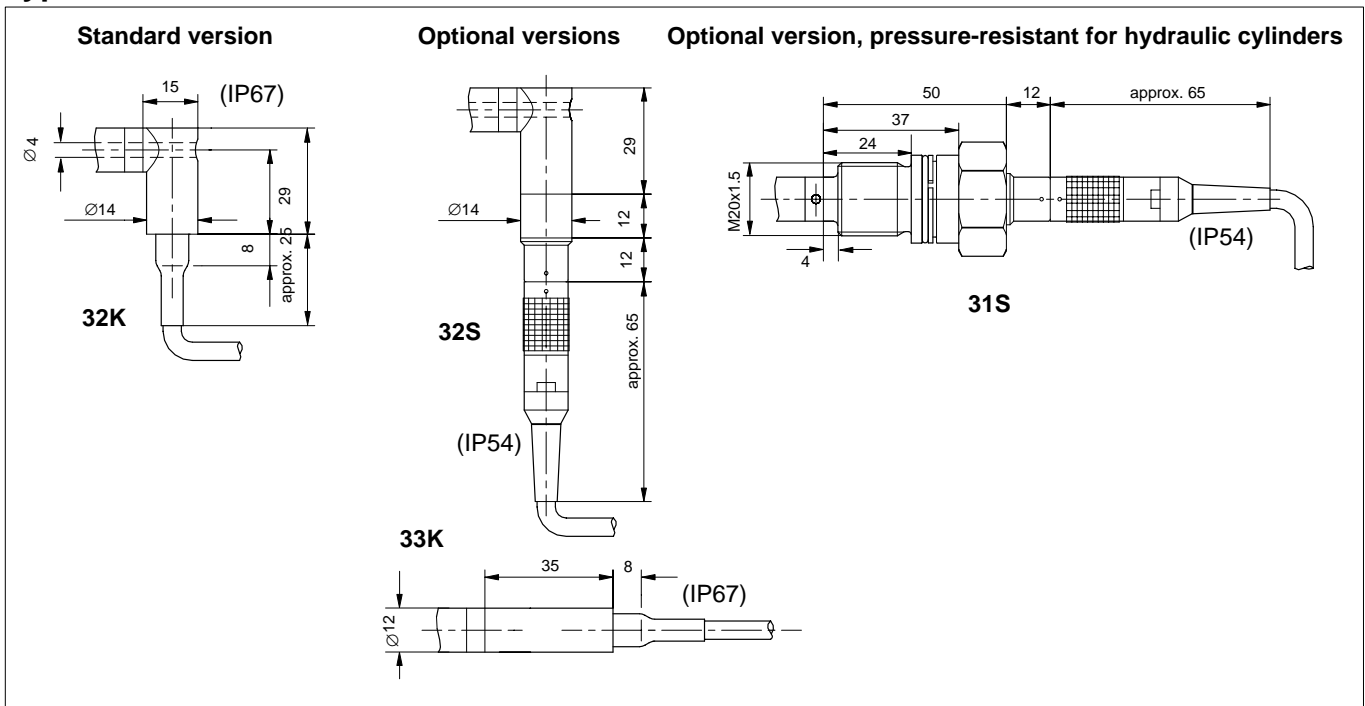
### Dimensions WA electronics

Length: 102 mm  
Width: 32 mm  
Depth: 13.5 mm

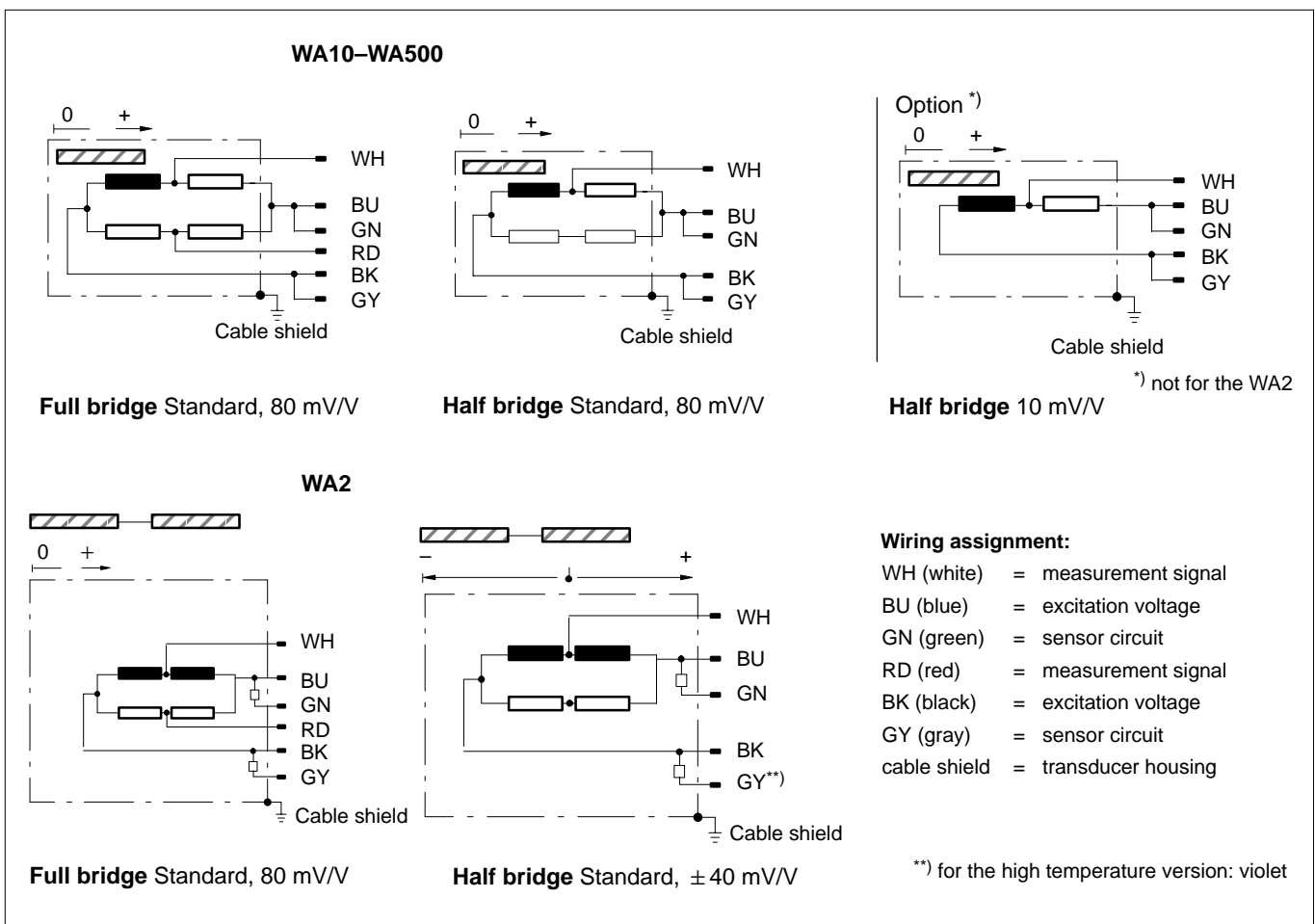
### WA electronics cable assignment



## Types of connection



## Principle of measurement, wiring assignment



## Options for WA

Code	Option 1: standard version	Option 1: high temperature version	
L	Plunger	M	Plunger, maximum temperature 150 °C
T <sup>3)</sup>	Displacement probe (002, 010W, 020W, 050W, 100W)	U <sup>3)</sup>	Displacement probe, maximum temperature 150 °C

Code	Option 2: measuring range [mm]
002W	0...2
010W	0...10
020W	0...20
050W	0...50
100W	0...100
200W	0...200
300W	0...300
500W	0...500

Code	Option 3: type of connection
32K	90°, for fitted cable, IP67, (for cable types K1, K2, K3, K4)
31S	M20x1.5; Lemos connector, IP54, (for cable types S1, S2, S3, S4)
32S	90°, for Lemos connector, IP54 (for cable types S1, S2, S3, S4)
33K	For fitted cable with straight junction, IP67 (for cable types K1, K2, K3, K4)

Code	Option 4: Cable type standard version (with Option 1 L,T only)
K1	Fitted PVC cable; 3 m long
K2 <sup>1)</sup>	Fitted PVC cable; length as required, max. 300 m
S1	Lemos connector, PVC cable; length 3 m
S2 <sup>1)</sup>	Lemos connector, PVC cable; length as required, max. 300 m
Option 4: cable type for high temperature version (with Opt.1 M,U only)	
K3	PTFE cable, fitted, 3 m, max. 150 °C
K4 <sup>1)</sup>	PTFE cable, fitted, max. 20 m, max. 150 °C
S3	Lemos connector, cable, 3 m, max. 150 °C
S4 <sup>1)</sup>	Lemos connector, cable, max. 20m, max. 150 °C

Code	Option 5: termination
F1	Unterminated
D1 <sup>6)</sup>	Connector DB-15P
M1 <sup>6)</sup>	Connector MS 3106PEMV
LB <sup>5)</sup>	For HBM-MGC AP801 S6 (4-pin Lemo connector, FGG.0B.304.CLCD56)

Code	Option 6: Linearity deviation
2	0.2 %
1 <sup>6)</sup>	0.1 %

Code	Option 7: Sensitivity
8	80 mV/V, full bridge, half bridge <sup>2)</sup>
2	0.5 – 10 V <sup>4)</sup> WA electronics, PVC cable 3 m

Order no.: K-WA- [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ] m - [ ] [ ] [ ] [ ] m

Typical order no. K-WA- [ T ] - [ 0 ] [ 5 ] [ 0 ] [ W ] - [ 3 ] [ 2 ] [ K ] - [ K ] [ 2 ] - [ L ] [ B ] - [ 2 ] - [ 2 ] - [ 0 ] [ 2 ] [ 0 ] m - [ 5 ] [ 0 ] m

Devices with [ ] are rapidly available from stock in standard version at no extra charge.

Customized transducer cable length

Customized cable length between WA electronics and evaluation device

Components supplied: displacement transducer, test report, probe pin extension 20mm, Operating Manual

1) Customized transducer cable length  
• with Option 7 / Code 2: 3...20 m

3) Displacement probe not available with 200 W, 300 W, 500 W

5) Only in connection with Option 7 Code 2; electronics

2) For the WA2: ± 40 mV/V

4) Customized cable length between WA electronics and evaluation device; 3...50 m

6) Not with Option 7, Code 2

## Mounting

1. Fitting suggestion	2. Fitting suggestion	3. Fitting suggestion
<p><b>WS/ZB12</b>                  2 mounting blocks with countersink Km4                  DIN 74                  1 mounting block with thread M4</p>	<p>4 fillister-head screws M4x25, DIN 912                  2 fillister-head screws M4x40, DIN 912</p>	<p>1 hexagonal-head bolt spanner a.f. 3</p>
<p>Operating temperature range from <math>-40\text{ }^{\circ}\text{C}</math>...<math>+80\text{ }^{\circ}\text{C}</math></p>		

### Accessories:

Mounting set WS/ZB12

### Replacement parts:

PVC cable such as cable type S1, 3 m, with Lemosa connector (male)  
 (2-9268.0675 for 80mV/V / 2-9268.0580 for 10 mV/V)

PVC cable such as cable type S2, any length  
 (max. 300 m, 2-9268.0676 for 80 mV/V / max. 20 m, 2-9268.0588 for 10 mV/V)

PTFE cable such as cable type S3, 3 m; with Lemosa connector (male)  
 (2-9268.0766 for 80 mV/V; 2-9268.0768 for 10 mV/V)

PTFE cable such as cable type S4, any length, max. 20 m  
 (2-9268.0767 for 80 mV/V; 2-9268.0769 for 10 mV/V)

Measurement insert with carbide ball (3-6061.0003)

Lemosa connector, detachable (6-pin, 3-3312.0126 for 80 mV/V / 8-pin, 3-3312.0139 for 10 mV/V)

Lemosa jack, detachable (6-pin, 3-3312.0235 for 80 mV/V / 8-pin, 3-3312.0140 for 10 mV/V)

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