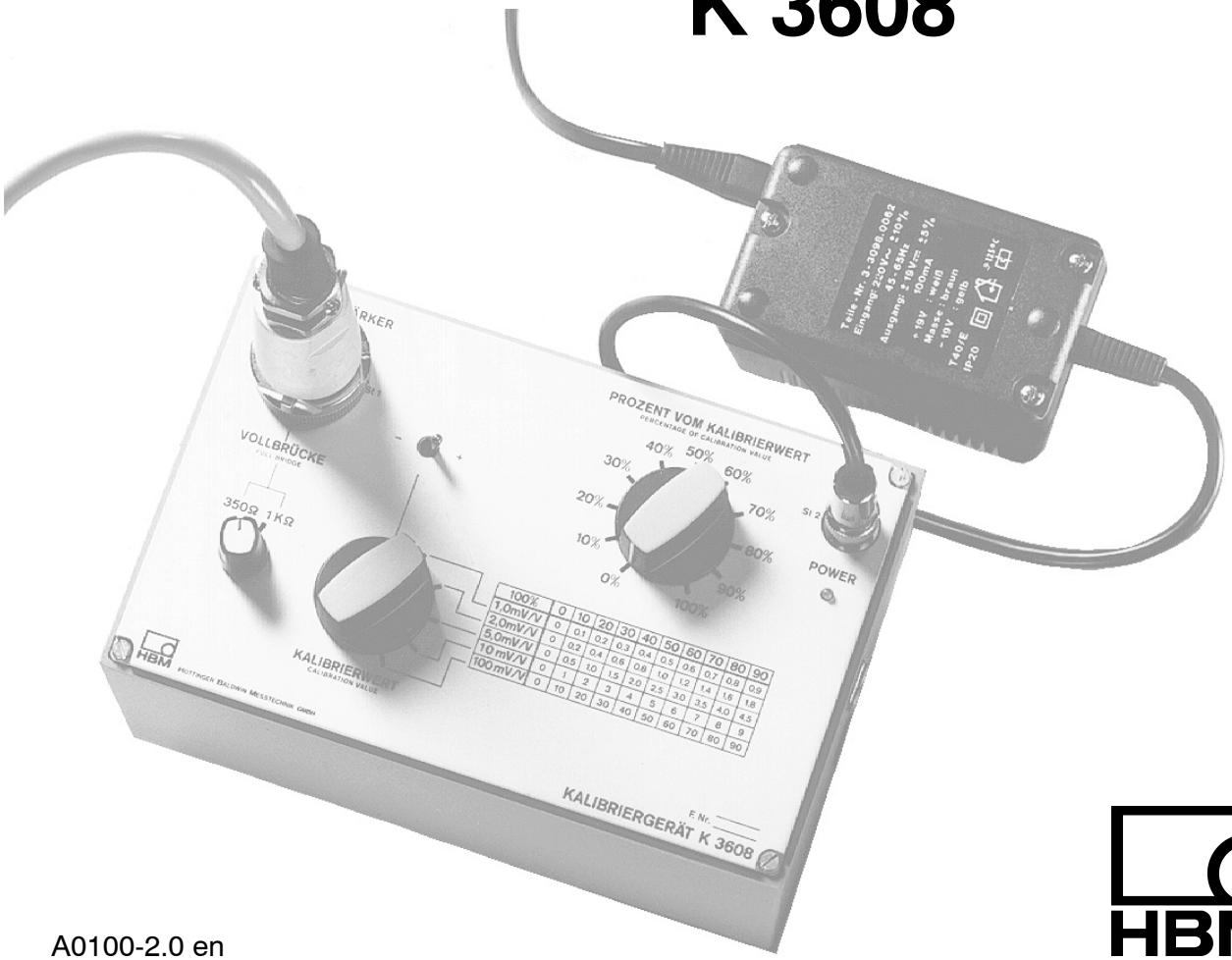
Operating manual

Calibration Unit
for measuring systems with strain gauge transducers

K 3608



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HBM

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1 Range of application

The electrical measurement of mechanical quantities calls for the most accurate relationship possible between the mechanical quantity acting on the transducer and the corrsponding electrical signal indicated at the end of the measuring system.

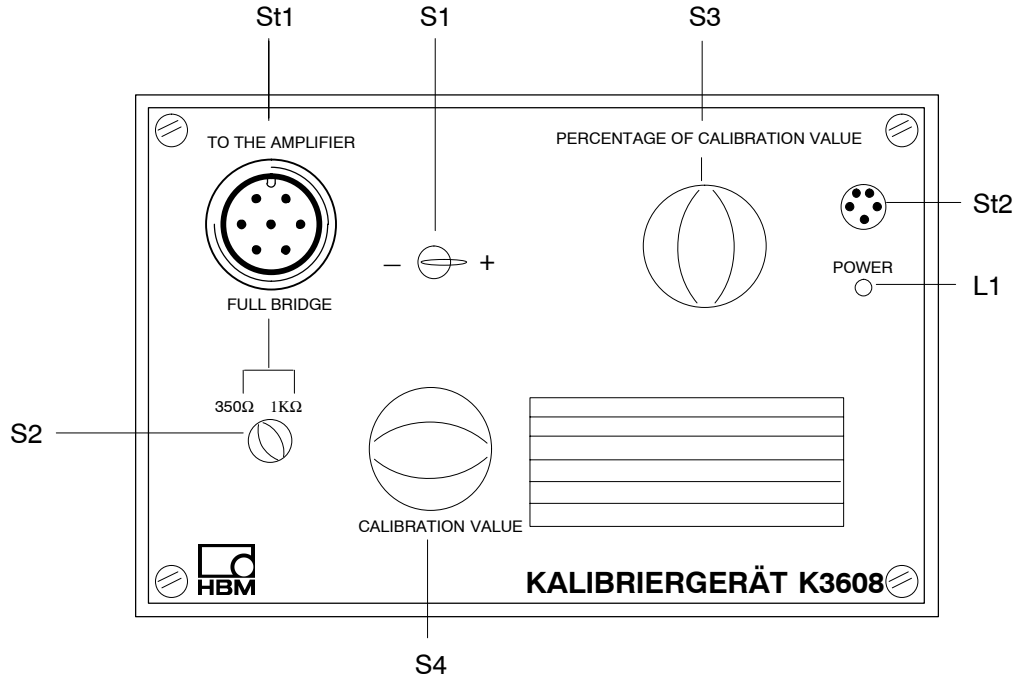
For this purpose, the K3608 Calibration Unit can be used instead of a strain-gauge transducer. The instrument produces precise electrical signals and thus simulates the effect of mechanical quantities acting on a strain–gauge transducer.

The compact designed calibration unit reaches an accuracy class of 0.0025 % for the frequency range from 225 Hz up to 600 Hz and a lower accuracy class of 0.01 % for DC or carrier frequency supply from 1000 up to 5000 Hz.

Five coarse ranges for detuning up to 100 mV/V can be subdivided into ten percent steps, thus enabling the calibration unit to be used for amplifier linearity check.

Contact the HBM calibration laboratory to order DKD certificates for the K3608. In this way, traceability is ensured.

2 Device front panel



S1 = Polarity switch

S2 = S–G substitute resistor selection–switch

S3 = Calibration–value percentage–switch

S4 = Calibration–value range switch

St1 = Amplifier connection

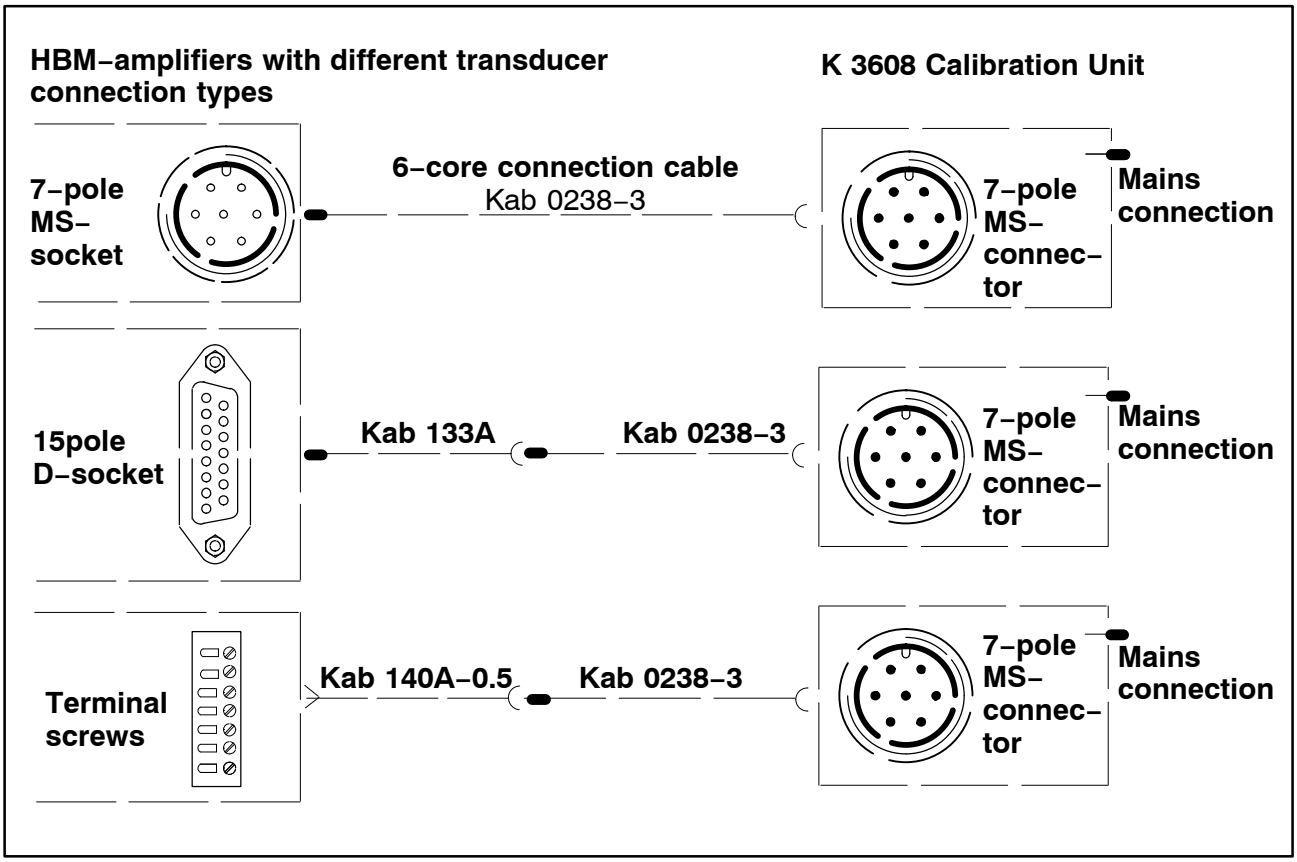
St2 = Mains connection

L1 = Pilot lamp

2.1 Cabling instructions

Use the Kab 0238–3 6–core cable with MS–plugs at both ends to connect the K 3608 to the HBM amplifier. With amplifiers that have not been equipped with an MS–connector, additional adapter cable must be used (refer to below figure).

The connection diagram is valid for amplifiers using the six–wire technique (sensor lines for the bridge–excitation voltage). This technique guarantees that the length of the measuring cable used has no effect on the accuracy of measurement.



3 Amplifier calibration

3.1 Procedure

1. Connect mains unit to plug St2 on calibration unit. L1 is flashing.
2. Use 6−core cable to connect K 3608 instead of the Full−bridge transducer via plug St1 to the amplifier.
3. Use rotary switch S2 to select strain gauge substitute resistors 350 Ω or 1 kΩ.
4. Use toggle switch S1 to select the desired polarity for the scheduled detuning.
5. Adjust calibration value range−switch S4 to the desired detuning range
6. Adjust calibration−value percentage−switch S3 to 0 % and check amplifier zero. Deviations from zero must be balanced on the amplifier.
7. Use percentage switch S3 to adjust the desired calibration signal according to the below table.
8. Adjust the desired amplifier output signal according to the instructions given in the operating manual. In general, the amplifier should be calibrated in the measuring range selected for the measurement. If another measuring range is selected for the amplifier, switching errors may occur.

3.1.1 Setups

Range steps for the calibration value in mV/V	**Calibration steps in %**										
	0	10	20	30	40	50	60	70	80	90	100
1,0	0,0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1,0
2,0	0,0	0,2	0,4	0,6	0,8	1,0	1,2	1,4	1,6	1,8	2,0
5,0	0,0	0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0
10,0	0,0	1,0	2,0	3,0	4,0	5,0	6,0	7,0	8,0	9,0	10,0
100,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0	100,0
	Calibration signal in mV/V										

4 Technical data

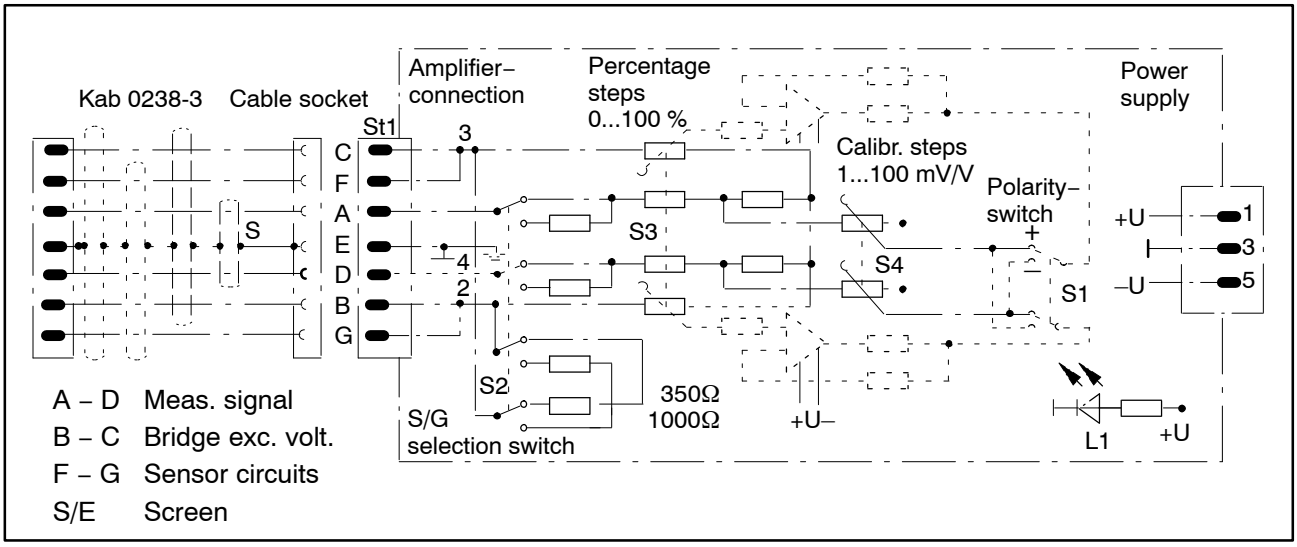
Type		**K3608**	
Accuracy class[1]		**0.0025**	**0.01**
Permissible frequency range for the external excitation voltage	Hz	225...600	DC, 1000...5000
Substitute resistor for strain gauge full bridges, switchable	Ω	350 or 1000	
Nominal value of the excitation voltage	V	5	
Maximum permissible excitation voltage	V	10	
Calibration steps			
5 ranges	mV/V	1; 2; 5; 10; 100	
11 steps within the ranges	%	0; 10; 20 ... 100	
Polarity switch		Positive[2] or negative output signal	
Step errors for the ranges related to the respective range full–scale value	%	< ± 0.0025	< ± 0.01
Step errors for the percent steps related to the respective range full–scale value	%	< ± 0.0025	
Absolute calibration of the full–scale–value for the range of 2 mV/V at 23 °C [73 °F]	mV/V	2.000 000 ± 0.000 050	–
Temperature effect on the absolute calibration per 10 K in the nominal temperature range	%	<0.0025	
Nominal temperature range	°C [°F]	+10...+40 [+50...+104]	+10 ... +40
Service temperature range	°C [°F]	0...+60 [+32...+140]	0 ... +60
Storage temperature range	°C [°F]	–25...+70 [–13...+158]	–25 ... +70
Supply voltage[3]	V	± 19	
Dimensions (h x w x d)			
K3608 calibration unit	mm	110 x 190 x 120	
Power supply	mm	50 x 95 x 57	
Weigth, approx.			
K3608 calibration unit	kg	1	
Power supply	kg	0.5	

[1] Only for connection using the 6–wire technique

[2] Positive means: strain between the bridge nodes 1 and 2 (between A and B on the Amphenol–plug)

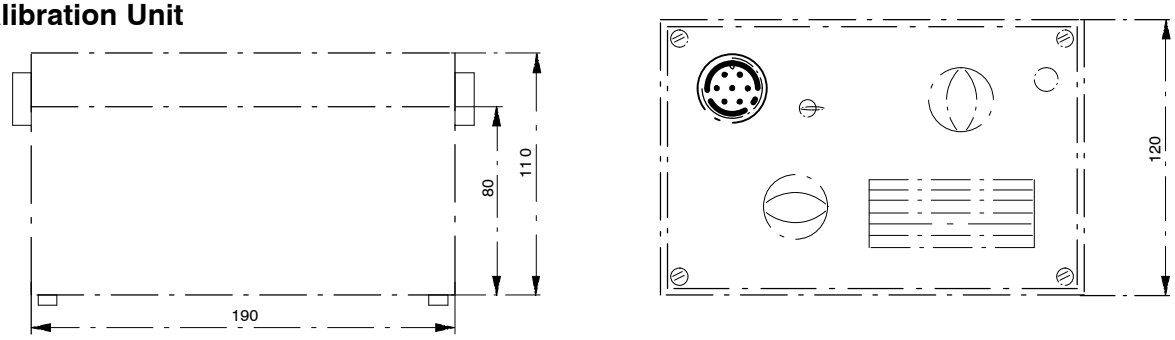
[3] Supplied by the external mains unit, mains voltage 220V ± 10 %, 45 ... 60 Hz.

5 Basic circuit diagram

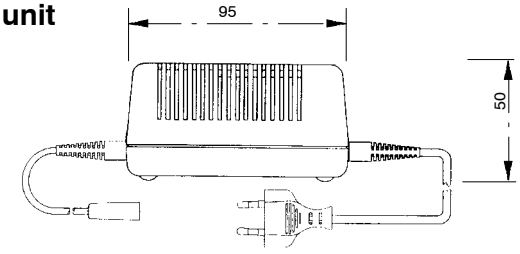


6 Dimensions [1 mm = 0.03937 inches]

Calibration Unit



Power supply unit



7 Accessories, included in scope of supply

Included in scope of supply:

Kab0238–3, connection cable, 3 m long, 6 cores, with MS plug and socket
Power supply unit, mains voltage 220V ± 10 %, 45 ... 60 Hz; (for repeat order: order no. 3–3318.0001)

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