Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

TYPE EVALUATION REPORT

Nº 1.12-4093446 Revision 1

on the

Type Examination of a

Load cell family

Type: Z6R

Manufacturer: Hottinger Brüel & Kjaer GmbH
Im Tiefen See 45
64293 Darmstadt
Germany

The type was tested under the following requirements:

R 60-1, edition 2000

This report belongs to the OIML Certificate Nº R60/2000-A-DE1-2019.03 Revision 1 and includes 7 pages.

Supplements within the scope of the revisions are marked by "[x]", while "x" is a place holder for the number of the revision.

CONTENTS

The Certificate and Test-Reports are based of the OIML-MAA-Certificate R60/2000-DE1-15.01 and have been transferred due to Procedural Documents OIML-CS PD-07.

Summary of the examination

The metrological characteristics of the load cells type Z6R are listed in Table 1. Further technical data are listed in the data sheet of the manufacturer in section "Data sheet and dimensions" of this annex.

Accuracy class			C3	D1
Maximum number of load cell intervals	n_{LC}		3000	1000
Rated output		mV/V	2	
Maximum capacity	E_{max}	kg	20 / 22 / 30 / 33 / 50 / 55 / 100 / 110 / 200 / 220	
Minimum load cell verification interval	$v_{min} = (E_{max} / Y)$		E_{max} / 11111	

Minimun dead load: 0%·E_{max}; Safe overload: 150%·E_{max}; Input impedance: 350 Ω

The determination of the load cell error, the stability of the dead load output, repeatability and creep in the temperature range of –10°C to +40°C as well as the tests of barometric pressure effects and the determination of the effects of cyclic damp heat have been performed according to OIML R60 (2000) with fraction p_{LC} = 0.7 as shown in Table 2 and provided in the following test report:

- Test Report No. PTB 1.12-4077191-1, dated September 29, 2015: E_{max}=50 kg; SN: 31322731; C3; Y=11111; Z=3000;
- Test Report No. PTB 1.12-4077191-2, dated February 17, 2016: E_{max}=20 kg; SN: 31337512; C3; Y=11111; Z=3000;

Table 2: Tests performed

Test	R60 (2000)		Tested samples	Result
Temperature test and repeatability at (20°C / 40°C / -10°C / 20°C)	5.1.1; 5.4	A.4.1	20 kg, 50 kg	+
Temp. effect on min. dead load output at (20°C / 40°C / -10°C / 20°C)	5.5.1.3	A.4.1.16	20 kg, 50 kg	+
Creep test at (20°C / 40°C / -10°C / 20°C)	5.3.1	A.4.2	20 kg, 50 kg	+
Minimum dead load output return at (20°C / 40°C / -10°C / 20°C)	5.3.2	A.4.3	20 kg, 50 kg	+
Barometric pressure effects at room temperature	5.5.2	A.4.4	20 kg, 50 kg	+
Damp heat test, cyclic, marked CH or (not marked)	5.5.3.1	A.4.5	20 kg, 50 kg	+

Result

On the basis of the performance tests and the examination of the instruments mentioned above and the documentation, the weighing instruments are permitted to comprise the functions, devices and characteristics features stated in the "general information concerning the pattern"; they fully meet the requirements of R 60-1.

Date of report: 07.12.2022

Signature: _____

GENERAL INFORMATION CONCERNING THE PATTERN

1. Description of the load cell

The load cells of the series Z6R are double bending beam load cells. They are made of stainless steel, the strain gauge application is hermetically sealed. Further essential characteristics are given in the data sheet, see section 6 of this annex.

Figure 1: Load cell type Z6R / 50 kg

The type designation is indicated as follows in the example on the name plate:

Z6RA C3 50 kg

- 50 kg — Maximum capacity E_{max}
- C3 — For weighing instruments class (III), max. number of load cell intervals in n_{LC} / 1000
- A — Cable entry
- Z6R — Load cell type

2. Documentation

The technical documents relating to this Certificate are deposited in the respective Set of Certification Documents at PTB. The Table of Contents of the Set of Certification Documents was sent to the owner of the Certificate.

3. Further information

The manufacturing process, material and sealing of the produced load cells have to be in accordance with the tested patterns; changes are only allowed with the permission of the PTB.

The typical errors related to linearity, hysteresis and temperature coefficient as indicated in the data sheet point out possible single errors of a pattern; however, the overall error of each pattern is determined by the maximum permissible error according to OIML R60 No 5.1.

The technical data, the dimensions of the load cell are given on page 6 of this annex, have to be complied with. The load cells also can be used in weighing instruments of class (IIII).

4. Data sheet and dimensions

Specifications of the Load Cell Family

Accuracy class acc. to OIML R60			D1	C3
Rated output	RO	mV/V	2 ± 0,1 %	2 ± 0,05 %
Nominal capacity	E_{max}	kg	20 / 22 / 30 / 33 / 50 / 55 / 100 / 110 / 200 / 220	
Max. number of load cell verification intervals	n_{LC}		1000	3000
Min. load cell verification interval	v_{min}	$\%\cdot E_{max}$	0,0360	0,0090
Temperature coefficient of zero	TC_0	$\%RO$ / 10 K	± 0,0500	± 0,0125
Temperature coefficient of sensitivity[1)]	TC_S	$\%\cdot RO$ / 10 K	± 0,0500	± 0,0080
Minimum dead load output return (MDLOR)	DR		-	
Hysteresis error [1)]	d_{hy}	$\%\cdot RO$	± 0,0500	± 0,0170
Non-Linearity [1)]	d_{lin}	$\%\cdot RO$	± 0,0500	± 0,0180
Creep error (30 minutes) / DR	d_{DR}	$\%\cdot RO$	± 0,0490	± 0,0166
Input resistance	R_{LC}	Ω	350 ... 480	
Output resistance	R_{out}	Ω	356 ± 0,2 [1] 2)	356 ± 0,12 [1] 3)
Insulation resistance	R_{IS}	GΩ	> 5	
Reference excitation voltage	U_{ref}	V	5	
Nominal range of excitation voltage	B_U	V	0,5 ... 12	
Nominal temperature range	B_T	°C	- 10 ... + 40	
Operating temperature range	B_{tu}	°C	- 30 ... + 70	
Storage temperature range	B_{tl}	°C	- 50 ... + 85	
Safe load limit	E_L	$\%\cdot E_{max}$	150	
Ultimate load	E_d	$\%\cdot E_{max}$	≥ 300	
Deflection at E_{max}, approx.	s_{nom}	mm	0,3 0,4 für/*for* E_{max} = 200, 220 kg	
Weight, without cable, approx.	G	kg	0,6	
Degree of protection according to EN60529			IP68	

1) The data for Non-linearity (d_{lin}), Hysteresis error (d_{hy}) and Temperature effect on sensitivity (TK_C) are typical values. The sum of these data meets the requirements according to OIML R60.

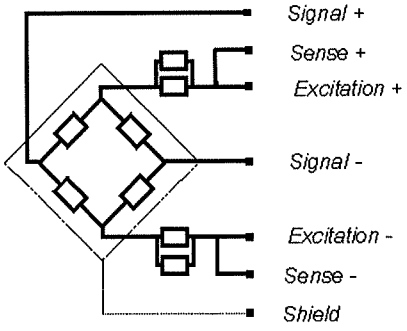
[1] 2) 355 ± 0,2 for Z6R-P

[1] 3) 355 ± 0,12 for Z6R-P

Wiring

The load cell is provided with a shielded 6 conductor cable.

[1] Alternatively, the load cell is provided with a built-in connector plug for a 6-conductor cable.

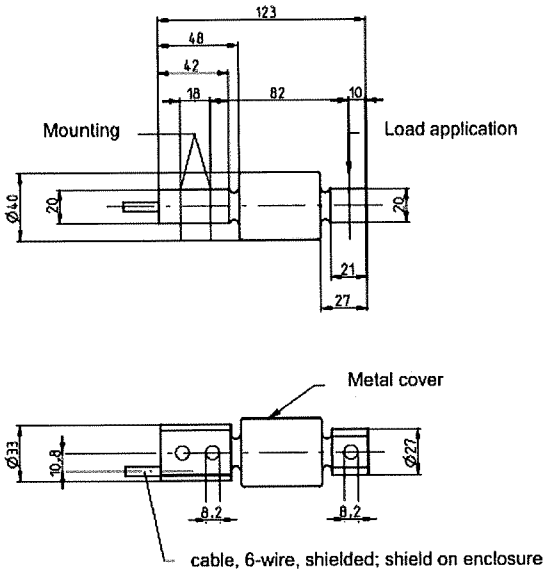


Connections

Connections		6-wires
Excitation	+	blue
Excitation	–	black
Signal	+	white
Signal	–	red
Sense	+	green
Sense	–	gray
Shield		stranded wire

Load cell dimensions in mm

Z6RA: Nominal (rated) loads 20 kg ... 220 kg



Z6RB: Nominal (rated) loads 20 kg ... 220 kg

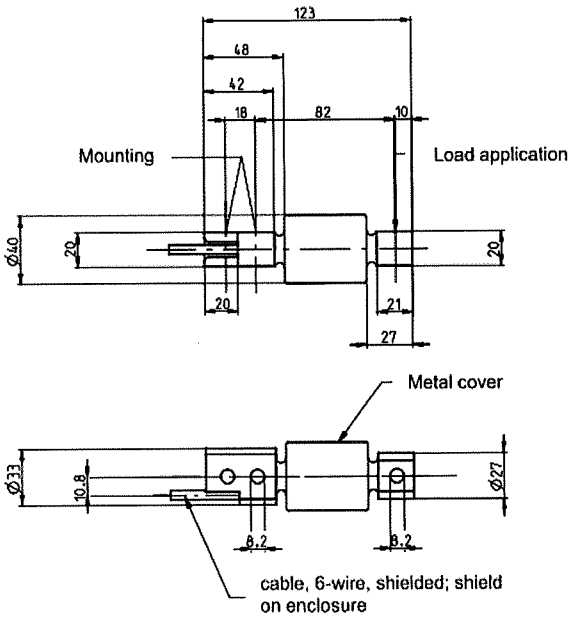
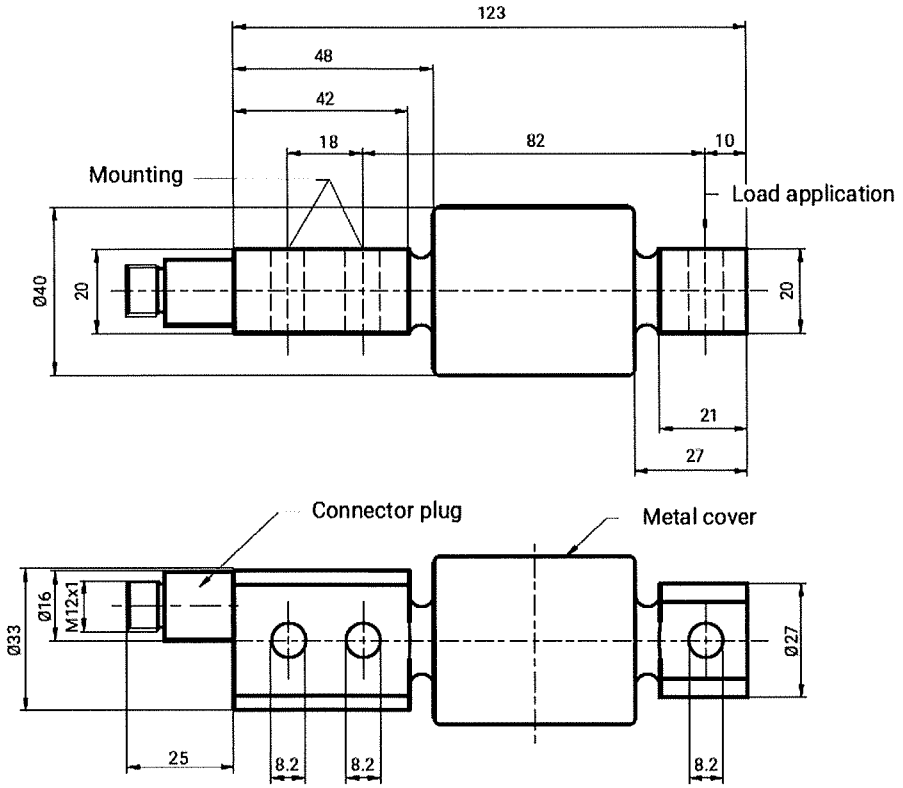


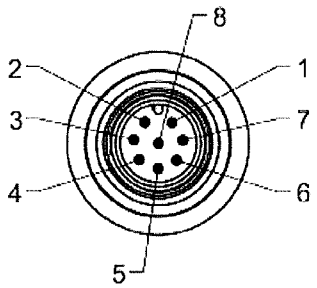
Figure 2: Dimensions of the load cell type Z6R

Z6R-P: Nominal loads 20 kg ... 200 kg



Dimensions in mm (1 mm = 0.03937 inches)

[1] Figure 3: Dimensions of the load cell type Z6R-P



Plug-in contact 1 = measurement signal (+)
Plug-in contact 2 = not in use
Plug-in contact 3 = sense lead (+)
Plug-in contact 4 = not in use
Plug-in contact 5 = sense lead (-)
Plug-in contact 6 = excitation voltage (-)
Plug-in contact 6 = excitation voltage (+)
Plug-in contact 8 = measurement signal (-)

[1] Figure 4: Connector pin assignment for the load cell type Z6R-P