

G. LUFFT Mess- und Regeltechnik GmbH

akkreditiert durch die / accredited by the

Deutsche Akkreditierungsstelle GmbH

als Kalibrierlaboratorium im / as calibration laboratory in the

Deutschen Kalibrierdienst



Kalibrierschein
Calibration certificate



Deutsche
Akkreditierungsstelle
D-K-15202-01-00

Kalibrierzeichen
Calibration mark

9753
D-K- 15202-01-00
2018-03

Gegenstand Object	temperature transmitter
Hersteller Manufacturer	NRG Systems
Typ Type	110 S
Fabrikat/Serien-Nr. Serial number	---
Auftraggeber Customer	HydroWind BVBA Veldkantstraat 119 B-1850 Grimbergen (Brussels)
Auftragsnummer Order No.	REP 6899A
Anzahl der Seiten des Kalibrierscheines Number of pages of the certificate	3
Datum der Kalibrierung Date of calibration	21.03.2018 to 22.03.2018



Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Die DAkkS ist Unterzeichner des multilateralen Übereinkommens der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine. Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).

The DAkkS is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates. The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Deutschen Akkreditierungsstelle GmbH als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift haben keine Gültigkeit.

This calibration certificate may not be reproduced other than in full except with the permission of both the Deutsche Akkreditierungsstelle GmbH and the issuing laboratory. Calibration certificates without signature are not valid.

Datum Date	Leiter des Kalibrierlaboratoriums Head of the calibration laboratory	Bearbeiter Person in charge
27.03.2018	 Helmut Hager	 Frank Bidmann

Dieser Kalibrierschein ist elektronisch signiert und liegt als Original als PDF-Datei vor.
This calibration certificate is electronic signed and exists as original as PDF-file.

G. LUFFT Mess- und Regeltechnik GmbH
Gutenbergstraße 20
DE-70736 Fellbach
Germany

Tel: ++49(0)711/51822-0
Fax: ++49(0)711/51822-41
E-Mail: info@lufft.de
www.lufft.de

Geschäftsführer/Managing directors:
Dr. Anton Felder
Jörg Mayer
Dr. Martin Nicklas
Axel Schmitz-Hübsch

Amtsgericht Stuttgart
HRB 721373
Ust.ID: DE 250580689
Steuernummer 90490/28336

9753
D-K- 15202-01-00
2018-03

calibration item

The calibration object is a temperature transmitter.
The calibration object is unscathed.

absolute pressure

measuring range	-40 °C ... 52.5 °C			
accuracy	+/- 1,24 K			
transfer function	temperature = (Voltage x 55,55) – 86,38 °C	Correlation	Slope[C/V]	Offset[C]
		0,999997604	55,977	-86,512

reference standard

Temperature

reference standards	PT100 resistance thermometer
reference numbers	006197, 006400, 006401, 006404, 006405
calibration marks	7764-, 7770-, 7771-, 7772-, 7773-D-K-15202-01-00 2017-06
uncertainty of measurement	5 mK...15 mK

Temperature

reference standard	precision temperature measuring instrument
reference number	801062
calibration mark	01-1090-D-K-15186-01-00 2016-10
uncertainty of measurement	3,3 mK...8,3 mK

Other measuring instruments

reference standard	digital multimeter
reference number	801058
calibration mark	2122-D-K-15042-01-00-2017-08
uncertainty of measurement	0,00015 % ... 0,028 % of value

calibration procedure

Temperature:

The temperature calibration was accomplished after the DAkkS-DKD guideline "Calibration of resistance thermometers" DAkkS-DKD-R 5-1 from December 2010.

The temperature values (t_{90}) refer to the International Temperature Scale of 1990 (ITS-90).

measurement conditions

temperature:

climate chamber, medium: air

description:

Adaptation time was at least 120 minutes for every calibration point.

The calibration unit was placed in the center of the climate chamber and was completely exposed to the climate conditions.

The output signal of the calibration unit was recorded with a multimeter and the software „BenchLink Datalogger 3, Ver. 3.10.00“. The measuring interval was 10 seconds and over 10 minutes the arithmetic mean value was build.

The supply voltage was 5 VDC.

ambient conditions

temperature in °C: 21,8 ± 1 K
 rel. humidity in %: 20 ± 10 %
 air pressure in mbar: 992 ± 10 mbar

calibration results

Temperature calibration

Reference standard	Calibration unit			
temperature t_{90} in °C	output signal U in V	temperature calculated t_{90} in °C	measurement deviation ΔT_{90} in K	uncertainty of measurement U in K
0,11	1,547	-0,44	-0,55	0,16
20,13	1,906	19,50	-0,63	0,16
40,19	2,263	39,33	-0,86	0,30

measurement uncertainty

The uncertainty stated is the expanded uncertainty U obtained by multiplying the standard uncertainty by the coverage factor $k = 2$. It has been determined in accordance with DAkkS-DKD-3. The value of the measurand lies with a normal distribution with a probability of 95 % within the assigned range of values.