

**Kalibrierzertifikat Nummer:**  
*Calibration Certificate Number:*

**2024-009**

Dieses Dokument bestätigt, dass das unten angeführte Gerät nach Hersteller Standard-Prozeduren mit Messgeräten, die nach DAkkS oder nationalen Standards kalibriert sind, kalibriert wurde.

This document certifies that the instrument detailed below has been calibrated according to Manufacturer Standard Procedures, using equipment with calibrations traceable to DAkkS (Germany) or National Standards.

Gerät: <i>Instrument Type:</i>	Valeport Midas SVP
Seriennummer: <i>Serial Number:</i>	31665
Bearbeitet von: <i>Calibrated by:</i>	Marleen Schweichel
Datum: <i>Date:</i>	09.01.2024
Unterschrift: <i>Signed:</i>	<i>M. Schweichel</i>

Qualitätsprüfzertifikat / Quality Test Certificate  
nach / according to DIN 55350 Part 18 – 4.2.1

Ausführliche Informationen zu den Ergebnissen der Kalibrierprozeduren der einzelnen installierten Sensoren sind in separaten Dokumenten verfügbar. Die Kalibrierzusammenfassung soll dem Gerät beigelegt sein. Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

Full details of the results from the calibration procedure applied to each fitted sensor are available in separate documents. This summary certificate should be kept with the instrument.

The user is obliged to have the object recalibrated at appropriate intervals.

Instrument Serial Number	31665
Transducer Type, mm	100
Transducer Ser No	48274
PCB Part No	0400554B
PCB Ser No	46621
SV Firmware Version	04007149B0
FPGA Firmware Version	714C
Module Number	12

Calibration Equipment used		
Instrument	Type	Serial No
Temp Bridge	ASL F17A	1204-2/3/8
PRT	Rosemount 162CE	4956

Stage 1: First order fit


Temp °C90	SoS from Bilaniuk & Wong m/s	Measured ToF nsec*100	Coefficients	Calc SoS from coefficients m/s	Error (Calc - True) m/s	Acceptable Error m/s	Pass/Fail
2.0296	1412.377	14529978	3.773390E+05	1412.377	0.000	±0.001	Pass
15.0863	1466.245	14010024	5.002787E+06	1466.245	0.000	±0.001	Pass

Stage 2: Enter calibration string

#024;12;1;15;0;0;0;5.002787E+06;3.773390E+05

Stage 3: Check point

Temp °C90	Actual SoS m/s	Measured SoS m/s	Error SoS Reading- Actual m/s	Acceptable Error m/s	Pass/Fail
15.0863	1466.245	1466.243	-0.002	±0.005	Pass

Name:	M. Schweichel
Date:	12.12.2023
Signature:	

# Sensor Calibration Record

# TEMPERATURE

Valeport Ltd

PCB	Serial no.	45341
	Part no.	400507F
	Firmware	040071160
	Thermistor Type	DS18B20
	Module	21

Temperature sensor	
Type	PRT
Serial no.	2751

Calibration Equipment used		
Instrument	Type	Serial No
Temp Bridge	ASL - F17A	12-2/3/8
PRT	Rosemount 162CE	4956

## As Received Calibration Check

(Based on counts measured during recalibration)

Original Cal String (#025;21;2)	21;15;1.000000e+00;0.000000e+00;0.000000e+00;1.178595e-10;9.817058e-04;-2.200123e+01		
Original Coefficients	a019	-2.200123e+01	
	a1	9.817058e-04	
	a2	1.178595e-10	
Corrective equation	y = 2.846161E-05x <sup>2</sup> + 9.987993E-01x + 1.330075E-02		

Polynomial Result °C	Temperature Error °C	Pass/Fail
2.005	-0.011	Fail
17.840	-0.001	Pass
34.748	-0.006	Fail

## PCB/Sensor calibration

### Stage 1: Obtain Calibration data and Polynomial fit

Counts nnnn	Bath temp °C [90]	Polynomial fit for raw data Order >>>> 2		Polynomial calculations		Acceptable Error	Pass/Fail
		Parameter	Value	Calc Temp °C [90]	Error [Calc - Actual] °C [90]		
24382	2.016	a0	-2.194736E+01	2.016	0.000	±0.005	Pass
40388	17.841	a1	9.792664E-04	17.841	0.000	±0.005	Pass
57411	34.754	a2	1.458089E-10	34.754	0.000	±0.005	Pass

Enter polynomial in cell E28

$$y = 1.458089E-10x^2 + 9.792664E-04x - 2.194736E+01$$

### Stage 2: Enter calibration string:

#024;21;2;15;1;0;0;1.458089E-10;9.792664E-04;-2.194736E+01

### Stage 3: Enter System Gain & Offset

#035;21;2;1000;-20000

### Stage 4: Post Calibration Check

Reading °C [90]	Bath temp °C [90]	Error [Reading-Actual] °C [90]	Acceptable Error	Pass/Fail
2.016	2.016	0.000	±0.005	Pass

Name	M. Schweichel
Date	07.12.23
Signed	<i>M. Schweichel</i>

PCB	
Serial no.	45341
Part no.	0400507F
Firmware	04007116O
Module	21

Pressure sensor	
Type	Keller-PAA 10LX
Serial no.	42657
Tx Range	3000 dBarAbs
Set Tx Range	3000 dBarAbs

Calibration Equipment used		
Instrument	Type	Serial No
DWT	Budenburg	3067
Barometer	Mensor 2400	650365

Stage 1: Determine Local pressure conditions

Air temperature	20.5	°C
Grid reference (OSGB36)	280657 East, 059840 North	
Height above sea level	5	metres
Local Gravity	9.81460	M/sec²
Gravity std for barometer	9.80665	M/sec²
Atmospheric pressure	779.190	mmHg
	10.3620	dBar

As Received Calibration Check #025;21;1				Polynomial Result	Pressure Error [Calc - Actual]		
(Based on counts measured during recalibration)				dBarA	dBar	%FS	Pass/Fail
Original Cal String				10.358	0.052	0.002	Pass
Original Coefficients				599.200	0.236	0.008	Pass
				1188.065	0.368	0.012	Fail
				1776.927	0.447	0.015	Fail
				2365.651	0.473	0.016	Fail
				2954.430	0.448	0.015	Fail
Corrective equation							

Stage 2: Observe Raw Data

Nominal Deadweight	List weights applied	Deadweight pressure	Atmospheric Pressure	Total pressure	Raw Output		Pressure Error (Measured - Actual)		Acceptable Error	Pass/Fail
dBar	(e.g. abfgk)	dBar	dBar	dBar	Pascals	dBar Equivalent	dBar	%FS		
0		0.0000	10.362	10.362	103055	10.306	-0.056	-0.002	±0.01	Pass
600	AJ	588.8342	10.362	599.196	5989643	598.964	-0.232	-0.008	±0.01	Pass
1200	AG	1177.6363	10.362	1187.998	11876974	1187.697	-0.301	-0.010	±0.01	Fail
1800	AGKL	1766.3339	10.362	1776.696	17764801	1776.480	-0.216	-0.007	±0.01	Pass
2400	ABK	2354.9849	10.362	2365.347	23651775	2365.178	-0.169	-0.006	±0.01	Pass
3000	ABG	2943.7126	10.362	2954.075	29539825	2953.983	-0.092	-0.003	±0.01	Pass

The sensor is out of specification. We recommend at least a Straight Line calibration. Select required fit from the drop down menu.

Fit Applied: 2nd Order Polynomial

Stage 3: Enter Calibration Data

Calibration String: #024;21;1;15;0.000000E+00;0.000000E+00;0.000000E+00;-8.886274E-16;1.000259E-04;7.917771E-02

Gain & Offset: #035;21;1;10000;0

Ensure that User calibration is OFF (#020;21;1;<space>) or set to linear fit (#022;21;1;15;0;0;0;1;0)

Stage 4: Post Calibration Check

Nominal Deadweight	List weights applied	Deadweight pressure	Atmospheric Pressure	Total pressure	Sensor Output	Pressure Error (Measured - Actual)		Acceptable Error	Pass/Fail
dBar	(e.g. abfgk)	dBar	dBar	dBar	dBar	dBar	%FS		
0		0.0000	10.362	10.362	10.391	0.029	0.001	±0.01	Pass
600	AJ	588.8342	10.362	599.196	599.420	0.224	0.007	±0.01	Pass
1200	AG	1177.6363	10.362	1187.998	1188.208	0.210	0.007	±0.01	Pass
1800	AGKL	1766.3339	10.362	1776.696	1776.908	0.212	0.007	±0.01	Pass
2400	ABK	2354.9849	10.362	2365.347	2365.555	0.208	0.007	±0.01	Pass
3000	ABG	2943.7126	10.362	2954.075	2954.259	0.184	0.006	±0.01	Pass

Name	M. Schweichel
Date	09.01.2024
<b>PASSED</b>	
Signed	M. Schweichel