WM Laboratory Ltd. 1158 Budapest, Késmárk u. 9.
Tel.: 06 1 374-0446 • Fax: 06 1 374-0447
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CALIBRATION CERTIFICATE

Object of calibration:	**differential pressure transmitter**
manufacturer:	Regin
type:	Presigo PDT12S25C-2
serial number:	11601080478:1335
measuring range (CH 1):	0…1250 Pa
measuring range (CH 2):	0…2500 Pa
resolution:	1 Pa
input measuring range:	0…10 V; -40…+60 °C
input resolution:	0,1 °C; 0,1 V

Customer: SmartNode Kft. / H-4030 Debrecen, Lándzsa u. 21

User: AB Regin / SE-428 22 Kållered, Box 116,

Place of calibration: Accredited calibration laboratory of WM Laboratory Ltd.

Calibration procedure: tested pressure transmitter and reference pressure calibrator was connected with flexible tube. The output of the instrument was connected to the PC. The input of the instrument was connected to the multimeter. Damping factor was 1 second. Supply voltage was 24 V. Load pressure was gradually changed by the pressure calibrator to the desired set values. All readings were made in stable pressure condition.
ID of used procedure: PKE-2012-01.
24,1 °C and 34 ± 2 %RH environmental conditions for calibration were met.

Calibration reference standard(s):

Reference	Manufacturer	Type	Serial number	Certificate
Differential pressure calibrator	Halstrup-Walcher GmbH	KAL100	9610.0037 AE463915	ATKIS 68301
Multifunctional calibrator	Beamex	MC2	20601	Commed Trade 8439/2016
Differential pressure meter	TSI Instruments Ltd.	PVM620	PVM621530004	ATKIS 68300
Power supply	MC Power	LAB-2303	DE 81972753	N/A

Results of the measurements are traced back to the primary standards of SI units.

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Results (Channel 1, Horizontal setting):

Upper range value [Pa]	Measured value [Pa]	Reference standard pressure [Pa]	Error [Pa]	Expanded uncertainty [Pa]
50	20	20,2	-0,2	0,7
50	40	40,1	-0,1	0,8
100	60	60,2	-0,2	0,9
100	80	80,1	-0,1	0,9
500	100	100,2	-0,2	1,0
500	250	250,0	0,0	1,3
1000	500	498,0	2,0	2,4
1000	750	748,0	2,0	3,3
1250	1000	996,8	3,2	4,6
1250	1200	1194,8	5,2	5,5

Results (Channel 1, Vertical setting):

Upper range value [Pa]	Measured value [Pa]	Reference standard pressure [Pa]	Error [Pa]	Expanded uncertainty [Pa]
50	20	20,2	-0,2	0,7
50	40	40,1	-0,1	0,8
100	60	60,2	-0,2	0,9
100	80	80,0	0,0	0,9
500	100	100,0	0,0	1,0
500	250	250,1	-0,1	1,3
1000	500	498,0	2,0	2,4
1000	750	747,0	3,0	3,3
1250	1000	997,0	3,0	4,6
1250	1200	1196,0	4,0	5,5

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Results (Channel 2, Horizontal setting):

Upper range value [Pa]	Measured value [Pa]	Reference standard pressure [Pa]	Error [Pa]	Expanded uncertainty [Pa]
100	20	20,0	0,0	0,7
100	40	40,1	-0,1	0,8
100	60	59,2	0,8	0,9
100	80	79,2	0,8	0,9
500	100	99,2	0,8	1,0
500	250	247,5	2,5	1,3
1000	500	494,9	5,1	2,4
1000	750	744,3	5,7	3,3
2500	1000	1693,8	6,2	4,6
2500	1200	2387,9	12,1	5,5

Results (Channel 2, Vertical setting):

Upper range value [Pa]	Measured value [Pa]	Reference standard pressure [Pa]	Error [Pa]	Expanded uncertainty [Pa]
100	20	20,0	0,0	0,7
100	40	40,1	-0,1	0,8
100	60	59,2	0,8	0,9
100	80	79,1	0,9	0,9
500	100	99,0	1,0	1,0
500	250	247,6	2,4	1,3
1000	500	494,9	5,1	2,4
1000	750	743,3	6,7	3,3
2500	1700	1698,0	2,0	4,6
2500	2400	2396,1	3,9	5,5

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Results (Universal input; CH 1; Pt1000)

Measured value	Reference standard value	Calculated value based on reference value	Error	Expanded uncertainty
[°C]	[Ω]	[°C]	[°C]	[K]
-10,0	960,86	-10,0	0,0	0,1
0,1	1000,00	0,0	0,1	0,1
10,1	1039,03	10,0	0,1	0,1
20,1	1077,94	20,0	0,1	0,1
40,0	1155,41	40,0	0,0	0,1

Results (Universal input; CH 1; Ni1000)

Measured value	Reference standard value	Calculated value based on reference value	Error	Expanded uncertainty
[°C]	[Ω]	[°C]	[°C]	[K]
-10,0	945,82	-10,0	0,0	0,1
0,0	1000,00	0,0	0,0	0,1
10,0	1055,52	10,0	0,0	0,1
20,0	1112,37	20,0	0,0	0,1
40,0	1230,11	40,0	0,0	0,1

Results (Universal input; CH 1; V)

Measured value	Reference standard value	Error	Expanded uncertainty
[V]	[V]	[V]	[V]
1,0	1,0	0,0	0,06
2,0	2,0	0,0	0,06
5,0	5,0	0,0	0,06
8,0	8,0	0,0	0,06
10,0	10,0	0,0	0,06

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Results (Universal input; CH 2; Pt1000)

Measured value	Reference standard value	Calculated value based on reference value	Error	Expanded uncertainty
[°C]	[Ω]	[°C]	[°C]	[K]
-10,0	960,86	-10,0	0,0	0,1
0,1	1000,00	0,0	0,1	0,1
10,1	1039,03	10,0	0,1	0,1
20,0	1077,94	20,0	0,0	0,1
40,0	1155,41	40,0	0,0	0,1

Results (Universal input; CH 2; Ni1000)

Measured value	Reference standard value	Calculated value based on reference value	Error	Expanded uncertainty
[°C]	[Ω]	[°C]	[°C]	[K]
-10,0	945,82	-10,0	0,0	0,1
0,0	1000,00	0,0	0,0	0,1
10,0	1055,52	10,0	0,0	0,1
20,1	1112,37	20,0	0,1	0,1
40,1	1230,11	40,0	0,1	0,1

Results (Universal input; CH 2; V)

Measured value	Reference standard value	Error	Expanded uncertainty
[V]	[V]	[V]	[V]
1,0	1,0	0,0	0,06
2,0	2,0	0,0	0,06
5,0	5,0	0,0	0,06
8,0	8,0	0,0	0,06
10,0	10,0	0,0	0,06

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Uncertainty of measurement:
The reported expanded uncertainty of measurement is stated uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%. This is the expanded measurement uncertainty include the reflectance standard, the calibration method, environmental conditions, etc. resulting from uncertainties.
The standard uncertainty in the determination of measurement uncertainty NAR-EA-4/02 expression of calibration in accordance with a publication.

Does User request classification: YES☒ NO☐

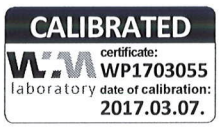
Requirement:

Pressure:	± 1 % FS
Pt1000 input:	± 0,5 °C
Ni1000 input:	± 0,5 °C
V input	± 1 % FS

Classification of instrument: PASS☒ FAIL☐ UNCLASSIFIABLE☐

Classification is based on the Users's request. The classification is Pass only if at every calibration point the sum of error found at calibration and the expanded uncertainty does not exceed the maximum allowable limit.

Notes:
Calibration certificate refers to the state of instrument without adjustment (As Found).
The following label was placed on the instrument:



Recalibration date considering the application and condition of the instrument is decided by User.

Calibration was done by:

Máté Farkas
WM Laboratory Ltd.

Verified by:

László Klagyivik
WM Laboratory Ltd.
Head of Laboratory