



Certificate of Calibration

Certificate N° FSL03349

Issued by: Furness Controls SARL

Date of Issue: 13 June 2024

Customer	:	SARLIN OY AB, KAIVOKSELANTIE 3-5
	:	PL 750/00101 HELSINKI, 01610 VANTAA
	:	FINLAND
Via	:	N/A
	:	
Calibrated at	:	Furness Controls SARL. Saint Michel sur Orge. France
Reference No	:	SAV08071
Customer Order No	:	PO 69412
Date Calibrated	:	12 JUNE 2024
	:	
Instrument	:	FCO510 Micromanometer
Ranges	:	± 200.00 Pa, ± 2000.0 Pa
Manufacturer	:	Furness Controls Limited
Serial No	:	9805145
Transducer No	:	
Firmware Version	:	x510A03a -1.100

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The results shown in this calibration certificate relate specifically to the items calibrated, as identified above.

This certificate is issued in accordance with the Quality System implemented by Furness Controls Limited, which is registered by NQA against the provisions of BS EN ISO 9001. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. A history of traceability to National Standards and a list of authorised signatories is available from Furness Controls SARL.

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Pressure Range: 0 to -200 Pa Signal O/P: 0 to 5 V

Results as received

Reference Pressure Pa	Output V	Instrument being calibrated			
		Error % of Rdg	Display Pa	Deviation Pa	Error % of Rdg
0,000	-0,00030	N/A	0,01	0,010	N/A
40,020	0,99902	0,15	-39,96	0,060	0,15
80,079	1,99839	0,18	-79,93	0,149	0,19
120,051	2,99717	0,14	-119,87	0,181	0,15
160,005	3,99429	0,15	-159,73	0,275	0,17
200,154	4,99608	0,16	-199,80	0,354	0,18
230,146	5,12103	11,00	-229,70	0,446	0,19
80,097	1,99889	0,18	-79,95	0,147	0,18
0,000	-0,00030	N/A	0,02	0,020	N/A

Each result is the average of 20 readings taken.

Pressure Range: 0 to -2000 Pa Signal O/P: 0 to 5 V

Results as received

Reference Pressure Pa	Output V	Instrument being calibrated			
		Error % of Rdg	Display Pa	Deviation Pa	Error % of Rdg
0,00	-0,00030	N/A	0,0	0,00	N/A
400,73	0,99986	0,20	-400,0	0,73	0,18
800,58	1,99803	0,17	-799,1	1,48	0,18
1200,42	2,99658	0,15	-1198,3	2,12	0,18
1600,36	3,99462	0,16	-1597,4	2,96	0,18
2000,32	4,99270	0,16	-1996,6	3,72	0,19
2300,63	5,12099	10,96	-2296,1	4,53	0,20
800,40	1,99748	0,18	-799,0	1,40	0,17
0,00	-0,00031	N/A	0,0	0,00	N/A

Each result is the average of 20 readings taken.

Pressure Range: 0 to 2000 Pa Signal O/P: 0 to 5 V

Results as received

Reference Pressure Pa	Output V	Instrument being calibrated			
		Error % of Rdg	Display Pa	Deviation Pa	Error % of Rdg
0,00	-0,00029	N/A	0,0	0,00	N/A
400,55	0,99945	-0,19	399,9	-0,65	-0,16
800,25	1,99701	-0,18	798,9	-1,35	-0,17
1200,45	2,99665	-0,15	1198,4	-2,05	-0,17
1600,21	3,99424	-0,16	1597,3	-2,91	-0,18
2000,79	4,99479	-0,14	1997,4	-3,39	-0,17
2300,01	5,12099	-10,94	2296,3	-3,71	-0,16
800,42	1,99827	-0,14	799,3	-1,12	-0,14
0,00	-0,00029	N/A	0,2	0,20	N/A

Each result is the average of 20 readings taken.

Pressure Range: 0 to 200 Pa Signal O/P: 0 to 5 V

Results as received

Reference Pressure Pa	Output V	Instrument being calibrated			
		Error % of Rdg	Display Pa	Deviation Pa	Error % of Rdg
0,000	-0,00029	N/A	0,00	0,000	N/A
40,038	0,99805	-0,29	39,94	-0,098	-0,24
80,028	1,99718	-0,18	79,88	-0,148	-0,18
120,028	2,99617	-0,15	119,82	-0,208	-0,17
160,061	3,99632	-0,13	159,80	-0,261	-0,16
200,078	4,99476	-0,14	199,72	-0,358	-0,18
230,043	5,12099	-10,96	229,66	-0,383	-0,17
80,042	1,99827	-0,14	79,93	-0,112	-0,14
0,000	-0,00005	N/A	0,02	0,020	N/A

Each result is the average of 20 readings taken.

Pressure Range: 0 to -200 Pa Signal O/P: 0 to 5 V

Results after adjustment

Reference Pressure Pa	Output V	Instrument being calibrated			
		Error % of Rdg	Display Pa	Deviation Pa	Error % of Rdg
0,000	-0,00029	N/A	0,00	0,000	N/A
40,002	0,99967	0,04	-40,00	0,002	0,00
80,013	2,00057	-0,01	-80,02	-0,007	-0,01
120,087	3,00267	-0,02	-120,08	0,007	0,01
160,052	4,00167	-0,01	-160,02	0,032	0,02
200,036	5,00213	-0,02	-200,03	0,006	0,00
230,006	5,12097	10,94	-229,98	0,026	0,01
80,051	2,00153	-0,01	-80,05	0,001	0,00
0,000	-0,00029	N/A	0,01	0,010	N/A

Each result is the average of 20 readings taken.

Pressure Range: 0 to -2000 Pa Signal O/P: 0 to 5 V

Results after adjustment

Reference Pressure Pa	Output V	Instrument being calibrated			
		Error % of Rdg	Display Pa	Deviation Pa	Error % of Rdg
0,00	-0,00029	N/A	0,0	0,00	N/A
400,37	1,00024	0,07	-400,3	0,07	0,02
800,13	2,00012	0,01	-800,0	0,13	0,02
1200,43	3,00124	-0,01	-1200,3	0,13	0,01
1600,24	4,00079	0,00	-1599,9	0,34	0,02
2000,51	5,00182	-0,01	-2000,1	0,41	0,02
2300,03	5,12097	10,94	-2299,6	0,43	0,02
800,47	2,00130	-0,01	-800,4	0,07	0,01
0,00	-0,00029	N/A	0,0	0,00	N/A

Each result is the average of 20 readings taken.

Pressure Range: 0 to 2000 Pa Signal O/P: 0 to 5 V

Results after adjustment

Reference Pressure Pa	Output V	Instrument being calibrated			
		Error % of Rdg	Display Pa	Deviation Pa	Error % of Rdg
0,00	-0,00029	N/A	0,0	0,00	N/A
400,08	1,00025	0,00	400,1	0,02	0,00
800,22	2,00070	0,01	800,2	-0,02	0,00
1200,39	3,00118	0,01	1200,2	-0,19	-0,02
1600,46	4,00160	0,01	1600,2	-0,26	-0,02
2000,46	5,00168	0,01	2000,1	-0,36	-0,02
2300,26	5,12097	-10,95	2300,2	-0,06	0,00
800,36	2,00104	0,01	800,2	-0,16	-0,02
0,00	-0,00029	N/A	0,0	0,00	N/A

Each result is the average of 20 readings taken.

Pressure Range: 0 to 200 Pa Signal O/P: 0 to 5 V

Results after adjustment

Reference Pressure Pa	Output V	Instrument being calibrated			
		Error % of Rdg	Display Pa	Deviation Pa	Error % of Rdg
0,000	-0,00029	N/A	0,00	0,000	N/A
40,022	1,00023	-0,03	40,02	-0,002	0,00
80,011	1,99962	-0,03	80,00	-0,011	-0,01
120,032	3,00102	0,01	120,02	-0,012	-0,01
160,011	4,00139	0,03	160,01	-0,001	0,00
200,221	5,00678	0,03	200,21	-0,011	-0,01
230,197	5,12095	-11,02	230,17	-0,027	-0,01
80,049	2,00082	-0,02	80,03	-0,019	-0,02
0,000	-0,00031	N/A	0,01	0,010	N/A

Each result is the average of 20 readings taken.

Temperature Sensor, Current Range : 4 to 20 mA

Results as received

Reference Current mA	Instrument being calibrated		
	Output mA	Deviation mA	Error % of Rdg
4,0000	3,969	-0,0310	-0,78
12,0006	11,973	-0,0276	-0,23
20,0009	19,977	-0,0239	-0,12

Each result is the average of 20 readings taken.

Temperature Sensor, Current Range : 4 to 20 mA

Results after adjustment

Reference Current mA	Instrument being calibrated		
	Output mA	Deviation mA	Error % of Rdg
4,0000	4,000	0,0000	0,00
12,0003	11,999	-0,0013	-0,01
20,0002	19,999	-0,0012	-0,01

Each result is the average of 20 readings taken.

Absolute Pressure Sensor, Current Range : 4 to 20 mA

Results as received

Reference Current mA	Instrument being calibrated		
	Output mA	Deviation mA	Error % of Rdg
3,9999	3,984	-0,0159	-0,40
12,0004	11,987	-0,0134	-0,11
20,0011	19,990	-0,0111	-0,06

Each result is the average of 20 readings taken.

Absolute Pressure Sensor, Current Range : 4 to 20 mA

Results after adjustment

Reference Current mA	Instrument being calibrated		
	Output mA	Deviation mA	Error % of Rdg
3,9999	4,000	0,0001	0,00
12,0004	12,000	-0,0004	0,00
20,0006	20,000	-0,0006	0,00

Each result is the average of 20 readings taken.

Test Engineer : Stephane Therese

Signature :


S Therese

Received in good condition, showing fair wear and tear.

The temperature of the instrument under test was : 20.2 ± 0.5 °C.

The ambient temperature was 20 ± 2 °C and the relative humidity was < 80 %.

Procedure:

The instrument provides a digital display and a voltage output corresponding to the applied differential pressure. The display can be programmed to indicate equivalent flowrate.

Inputs are available for two 4 - 20 mA transmitters to indicate temperature and absolute pressure. When adjusted, the pressure indication was set to zero before each adjusted reading was taken.

The reference pressure was measured using a digital piston pressure calibrator.

The output was measured using an Agilent 34401A digital multimeter.

The readings of the reference standards and of the instrument under test were taken either manually or via RS232 when available to a PC running a calibration program.

A set of readings was taken as received and a second set of readings was taken after adjustment.

Negative readings were taken with positive pressure applied to the negative port of the instrument.

Standards & Uncertainties

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

The uncertainty associated with the measurement of the applied pressure is:

0 to 3.2 kPa 0.014 % + 0.040 Pa

The uncertainty of the indicated pressure is the uncertainty of the applied pressure +1 lsd (EUT).

The uncertainty of the indicated voltage (0-10 V) is 0.0035 % of reading + 30 μ V + 1 lsd (EUT).

The uncertainty of the indicated current is 0.010 % of reading + 1.0 μ A + 1 lsd (EUT).

The uncertainty of the electrical output is the uncertainty of the applied pressure plus the uncertainty of the electrical measurement.

Pressure Standard(s) used: FRS4 RS35 (0 to 3 kPa)

Electrical Standard(s) used: Agilent 34401A RS51

Programme & version: CS043: V4.4.6.FCO510.52

Comments:

An instrument leak test was performed.

The manufacturer's specification for accuracy of this instrument is 0.25 % R (From 10% to 100% of range).

Test Engineer : Stephane Therese

Signature :


S Therese

----- End of calibration certificate -----