

Test Report



Type testing of the PD 340 flow transmitter in accordance with OIML R 117 2CD

Performed for PROCES-DATA A/S

DANAK-199767, Rev. 2

Project no.: A530047

Page 1 of 8

3 annexes

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Test object PD 340 flow transmitter

Report no. DANAK-199767, Rev. 2

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Manufacturer PROCES-DATA A/S

Specifications OIML R 117-1 2CD, 02 April 2004
“Measuring Systems for Liquids other than Water”.

Results The flow sensor tested complies with the requirements of OIML R 117-1 2CD for the tests carried out.

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Table of contents		Page
1.	Introduction	4
2.	Conclusion	5
3.	Test item	6
3.1	Connected cables	6
4.	Summary of results for the flow sensor	7
4.1	Test set-up	8

Annex 1 Measurement results (16 pages)

Annex 2 Calibration certificate from FORCE technology (2 page)

Annex 3 Test equipment used for legal metrology testing (1 page)

1. Introduction

This report describes tests carried out to ascertain that the flow transmitter tested complies with the requirements described in OIML R 117-1 2CD, 02 April 2004 annex A “Performance tests for electronic measuring systems”. Revision 2 of the report replaces previous reports after reconfirmation of specific test data. No changes in conclusions are made.

The manufacturer has developed a new electronic module for the PD 340 flow sensor due to delivery problems with traditional leaded components. All other parts of the flow sensor remain unchanged.

All tests from A.4.1 to A.4.15 in OIML R 117-1 2CD, 02 April 2004 annex A, except from A.4.4 Vibration and A.4.5 Mains voltage variation was carried out.

A.4.4 Vibration (random)

Test is not relevant. The mechanical construction of the flow meter is unchanged and the new electronic module is potted with the same compound using an unchanged potting process. Furthermore, the new electronic module is populated by SMD components and the previous dual circuit boards are combined into one circuit board in the new electronic module. All changes in the electronic module enhance the vibration robustness of the module. The flow meter containing the previous version of the electronic module has passed the vibration test covered by FORCE report KVFMKX3003.

A.4.5 Mains voltage variation

The test is not relevant. The test level in clause A.4.15.1 is $\pm 33.3\%$ and the test level in clause A.4.5 is $+10\%$ and -15% . Therefore, the A.4.5 test is covered by the A.4.15.1 test.

During all tests, a simulator was mounted in the flow sensor pipe. Therefore, it was found necessary to verify the flow performance for the complete flow sensor. FORCE Technology made this verification.

Test were carried out according to OILM R 117-1 2CD classes:

Accuracy:	0.5%
Humidity:	H3
Electrical disturbance:	E2
Temperature heat	3
Temperature cold	3
Temperature damp	2

2. Conclusion

All the tests results and visual inspections performed showed that the flow sensor tested complies with the requirements in OIML R 117-1 2CD, 02 April 2004 annex A for all tests carried out.

The new version of the electronic module as tested according to OIML R 117-1 2CD is a functional replacement of the original electronic module. The original module was tested according to "OIML^{4th} preliminary Draft - Measuring systems for liquids other than water"

3. Test item

Manufacturer	:	PROCES-DATA A/S
Name	:	Flow transmitter
Type	:	PD 340
Serial no.	:	Measuring head : 471817 Electronic module : A530047-EMC Terminal module : 469360
Output signal	:	Pulses
Pulse value	:	0.0001 m ³ /pulse
Power supply	:	24 VDC
Power consumption	:	Max 6 W
Accuracy class	:	0.5%

3.1 Connected cables

Power cable

Temperature sensor cable, PT100

Data cable, P-NET

Cable to display unit PD 210

Output cable

4. Summary of results for the flow sensor

Clause	Test	Max fault
		%
A.4.1	Dry heat none-condensing	0.01
A.4.2	Cold	0.01
A.4.3	Damp heat cyclic - condensing	0.01
A.4.7	Burst (transients) on AC and DC mains	0.01
A.4.8	Electrostatic discharge	0.03
A.4.9	Burst (transients) on signal, data and control lines	0.03
A.4.10	Surge on signal, data and control lines	0.03
A.4.11	Voltage dips, short interruptions and voltage variations on DC mains power	
	Voltage dips 40%, duration 0.03s	0.00
	Voltage dips 70%, duration 1s	0.03
	Short interruptions, 0.03s	0.01
	Voltage variations 85%	0.03
	Voltage variations 120%	0.01
A.4.12	Ripple on DC input power ports	0.03
A.4.13	Surges on AC and DC mains lines	0.10
A.4.14	Radiated, radio frequency (A.4.14.1 and A.4.14.2)	
	Horizontal	0.04
	Vertical	0.11
A.4.14.3	Conducted electromagnetic fields	0.17
A.4.15.1	Voltage variations	0.00
A.4.15.2	Electrical transient conducted along supply lines	0.10 *)
A.4.15.3	Electrical transient conducted via lines other than supply lines	0.10

*) During tests where power failure occurred, an error code which contains the required checking facilities for handling the error, OIML R 117-1 2 CD clause 4.3, was sent to the system controller.

For further information see *Annex I* which shows the measuring results obtained from the tests performed on the flow sensor.

4.1 Test set-up

During all tests, a flow simulator was inserted in the flow sensor simulating a flow rate of approximately 80 m³/h.

The measurements were carried out in such a way that the time it takes for counting a given number of pulses from the sensor was measured. The time measured was then converted into a volume using the actual pulse value of the sensor:

$$V_{ref} = \frac{q_{sim} * t_{meas}}{3600}$$

where q_{sim} is the simulated flow rate =80 m³/h or 76.5 m³/h
 t_{meas} is the measuring time.

Calculating the volume obtained by the flow sensor:

$$V_{dut} = P_{dut} * pv$$

where P_{dut} is the number of pulses
 pv is the pulse value

Calculating the error:

$$Error = 100 * \frac{V_{dut} / V_{ref}}{V_{ref}}$$