



# EU-TYPE EXAMINATION CERTIFICATE

Number: TCM 141/18 - 5587

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**In accordance:** with Directive 2014/32/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments (implemented in Czech Republic by Government Order No. 120/2016 Coll.).

**Manufacturer:** Sahin Hidrolik Makina Hirdavat Telekomunikasyon San. Tic. Ltd. Sti.  
Meclis Mahallesi Atatürk Caddesi No: 53  
34785 Sancaktepe - Istanbul  
Turkey

**For:** LPG dispenser  
type FALCON ARMA

accuracy class 1.0  
Liquids: LPG (liquefied petroleum gas)  
Environmental classes: M1, E1 or E2, H3

**Valid until:** 13 August 2028

**Document No:** 0511-CS-A030-18

**Description:** Essential characteristics, approved conditions and special conditions, if any, are described in this certificate.

**Date of issue:** 14 August 2018

**Certificate approved by:**



RNDr. Pavel Klenovský

## 1. Measuring device description

The FALCON ARMA xx LPG dispensers are designed for measurement of liquefied petroleum gas volumes as a legal measuring device in the sense of the Directive of the European Parliament and of the Council no. 2014/32/EU of measuring instruments, as amended and are used for the refuelling of motor vehicles.

The dispensers are produced under trademark Falcon.

This certificate covers all types of the ARMA xx series LPG dispensers. All of them consist of the same components and they differ only in number of nozzles, frame construction and design that don't influence a metrological function.

The ARMA xx measuring system consists of a pipe, filter, gas separator, non-return valve, measurement transducer consisting of volumetric PD measurement sensor and pulse transmitter, differential valve, solenoid valve, electronic calculator with indicating device and hose with dispensing nozzle representing a transfer point.

LPG is delivered to the measuring system by an external pumping system.

Correction of the measurement accuracy can be done via correction factor parameter of the electronic calculator or via adjustment bolt on the measuring sensor.

Model designation of the Falcon Arma XX Series LPG Dispenser:

FALCON ARMA XX SERIES LPG DISPENSER TYPES				
BRAND	MODEL	TYPE	NUMBER OF PRODUCT	NUMBER OF NOZZLE
FALCON	ARMA	11	1	1
		12	1	2
		14	1	4

Optional functions that are subject to the MID requirements (functions of the calculator):

- ATC function – automatic conversion of the measured volume to volume at base conditions
- Pre-setting function of volume and price
- Electromechanical totalizer

### 1.1. Measuring sensor (flow meter)

Manufacturer	Sahin Hidrolik Makina Hirdavat Telekomunikasyon San. Tic.
Pattern designation	FLC 4125
Accuracy class	1.0
Minimum flow rate	5 L/min
Maximum flow rate	50 L/min
Minimum measured quantity	5 L
Liquid temperature range	(-10 to 50) °C
Cyclic volume	0.5 L / rev.
Liquids to be measured	LPG
Approval certificate	RO 2275-12042

**1.2. Pulser**

Manufacturer	Akord
Pattern designation	PS2
Accuracy class	0.5
Output	Two-channel, square waves
Ambient temperature range	(-25 to +55) °C
Environmental classes	M1, E1, H3

Manufacturer	Akord
Pattern designation	v1.0
Accuracy class	0.5
Output	Two-channel, square waves
Ambient temperature range	(-25 to +55) °C
Environmental classes	M1, E2, H3

Manufacturer	Eltomatic
Pattern designation	01-09
Accuracy class	0.5
Output	Two-channel, square waves
Ambient temperature range	(-25 to +55) °C
Environmental classes	M1, E2, H3

**1.3. Calculator**

Manufacturer	Akord
Pattern designation	PCUX1N, PCUX2N, PCUX4N
Accuracy class	0.5, 1.0
Ambient temperature range	(-25 to +55) °C
Environmental classes	M1, E1, H3
Power supply	90 - 240 V AC, 50 Hz
Compatible pulser	two-channel
Software versions (W&M checksum)	1.0.2 (71B384EB) 1.1.0 (CDF5B93E)
Approval certificate	ZR 141/17-0144

Akord PCUXN electronic calculating / indicating device (calculator).

PCUXN calculator receives measured data in form of pulses from one, two, three or four pulse transmitters, converts them to the volume and displays measured values.

PCUXN calculator can be made in three models:

- PCUX1N – can control one nozzle / measuring transducer
- PCUX2N – can control two nozzles / measuring transducers simultaneously
- PCUX4N - can control four nozzles / measuring transducers simultaneously

The calculator is controlled by the keypad. It can be used for a preset quantity or price before the filling operation and for adjustment of the menu parameters.

To access settings of the parameters in Service menu and Factory menu that are under legal control it is necessary to push a button placed on the CPU motherboard. This button is protected by a sealed cover.

The software version and check sum can be identified by the Pump menu and parameter 105 – information. To display the software, push once Menu button, then once P3 button, then once Menu button. Then push six times P3 button to display the check sum.

The calculator is equipped with an ATC conversion function for conversion of the measured data to volume at a base temperature of 15 °C. ATC is available only for LPG, diesels, gasoline and aviation fuel. Setting of the function is done in the Service menu and it is protected by a sealed button. The function can be disabled or enabled for each nozzle by the service parameter No. 304. Type of the product and density for each nozzle can be selected by the service parameter No. 302.

When the ATC function is enabled, volume converted to 15°C is indicated on the display.

A certified temperature probe has to be connected to the CPU in case of active ATC function.

Other information about the calculator and settings are to be found in the Evaluation certificate No. ZR 141/17-0144.

Manufacturer	Akord
Pattern designation	PCUX1 and MS2
Accuracy class	0.5, 1.0
Ambient temperature range	(-25 to +55) °C
Environmental classes	M1, E2, H3
Power supply	90 - 240 V AC, 50 Hz
Compatible pulser	two-channel
Software versions (W&M checksum)	Falcon VER 4.13 (0x3d79) and (0xe89a)
Approval certificate	RO-2275-15264

Akord MS2 can control up to two nozzles / measuring transducers simultaneously.

Akord PCUX1 can control one nozzle / measuring transducer.

There are 3 menus in MS2 and PCUX1 electronic control panel units (CPU). They are as following;

- a) Pump Menu: Access to basic parameters without entering any password.
- b) Administration Menu: Access to this menu needs a service key (mechanical seal) which provided from AKORD to I2C Bus Entrance of CPU + Entering a password.
- c) Service Menu contains metrologically relevant parameters. Access to this menu needs a service key (mechanical seal) which provided from AKORD to I2C Bus Entrance of CPU + Entering a password.

#### 1.4. Differential valve

Manufacturer	Sahin Hidrolik Makina Hirdavat Telekomunikasyon San. Tic
Pattern designation	FLC 330
Differential pressure	1.7 bar

#### 1.5. Hose

- SEL LPG Hose TS EN 1762 Type: D DN 1/2" and 5/8" ; maximum length: 5m,
- TRELLEBORG LPG Hose EN 1762 Type: D ; DN 1/2" and 5/8" ; maximum length: 5m

### 1.6. Temperature probe

For measurement of the liquid temperature is used a DS18B20 digital temperature probe.

- Provides 9-bit to 12-bit Celsius temperature measurements,
- Resolution 0.1 °C
- Measuring range (-10 to 50) °C
- length of the sensor 45 mm
- digital output that is to be connected directly to the CPU

### 2. Basic technical and metrological data

Accuracy class	1.0
Maximum flow rate $Q_{\max}$ [L/min]	50
Minimum flow rate $Q_{\min}$ [L/min]	5
Minimum measured quantity MMQ [L]	5
Liquids to be measured	LPG (liquefied petroleum gas)
Liquid temperature range [°C]	-10 to 50
Ambient temperature range [°C]	-25 to 55
Maximum pressure [MPa]	2.5
Mechanical class	M1
Electromagnetic class	E1 or E2 (Defined by an electronic calculator)
Environmental class	H3
Type of display	electronic
Measurement unit	volume [L] , volume at 15 °C [L]
Smallest scale interval of the indication [L]	0.01
Approved software (check sum)	See point 1.3

### 3. Test

Technical tests and conformity assessment of the FALCON ARMA LPG dispenser have been performed in conformity with the following documents:

- Directive of the European Parliament and of the Council no. 2014/32/EU of measuring instruments,
- International recommendation OIML R 117-1 Edition 2007 *Dynamic measuring systems for liquids other than water*,
- International recommendation OIML R 117-2 Edition 2014 *Metrological controls and performance tests*,
- WELMEC Guide 7.2 *Software Guide*.

Examination of the FALCON ARMA LPG dispenser have been based on a supporting documentation. Following documentation has been submitted by the manufacturer:

- EC-Type examination certificate No. RO-2275-15264,
- Evaluation certificate No. ZR 141/17-0144,
- Evaluation certificate No. RO 2275-12042.

Related Test report No. 6015-PT-P0001-18 issued by Czech metrology institute (Notified Body No. 1383).

### 4. The measuring device data

At least following data are to be stated on the measurement sensor, pulser, differential valve and electronic calculator:

- Manufacturer's name, mark or trademark
- Type designation
- Serial number
- Alternatively other relevant characteristics (e.g.  $Q_{\max}$ ,  $Q_{\min}$ ,  $P_{\max}$ , liquids to be measured, MMQ, temperature range etc.)



Following data are to be stated on a name plate of the LPG dispenser:

- The "CE" marking and supplementary metrology marking
- Number of EU-type examination certificate
- Manufacturer's name, mark or trademark and post address
- Type designation
- Serial number and year of manufacture
- Accuracy class 1.0
- Minimum measured quantity
- Maximum flowrate ( $Q_{max}$ )
- Minimum flowrate ( $Q_{min}$ )
- Maximum pressure ( $p_{max}$ )
- Liquids to be measured
- Liquid temperature range
- Ambient temperature range
- Mechanical class
- Electromagnetic class

The name plate must be inseparably fixed to the construction on clearly visible place in normal conditions of use.

Following data are to be stated on each face of indicating device and shall be in official language of country where the dispenser is put into operation:

- Unit of national currency (e.g. €) is indicated next to price display
- Unit of volume ( $\ell$  or L or word Litre) is indicated next to volume display
- Unit price per litre (e.g. €/L or €/Litre) is indicated next to unit price display
- Information regarding the minimum measured quantity (MMQ)

### 5. Conditions for approval and sealing

Before putting into use it has to be verified that the fuel dispenser is in conformity with requirements of this certificate.

Functional and accuracy test within verification is to be performed at installation place or at the fabrication location and using LPG within given flow rate range and pressure range of the measuring system and in normal conditions of operation.

All measured errors have to be in range of tolerance  $\pm 1\%$ .

Functional and measurement test of the ATC function is to be done in case that the dispenser is intended for measurement in compensated volume.

The measuring system is to be sealed after the tests and conformity assessment with a positive result according to following description and pictures No. 1 to 7.

Seals:

On the FLC4125 measuring sensor:

- Side piston covers of the sensor
- Cap of the adjustment device
- Upper cover of the sensor

On the pulser:

- Connection of the pulser to the upper cover of the sensor
- Cover of the pulser

On the PCUXN and MS2 electronic calculator:

- Cover of the CPU has to be sealed by two screws
- Totalizer

On the temperature probe (in case of active ATC function):

- Cover of the probe

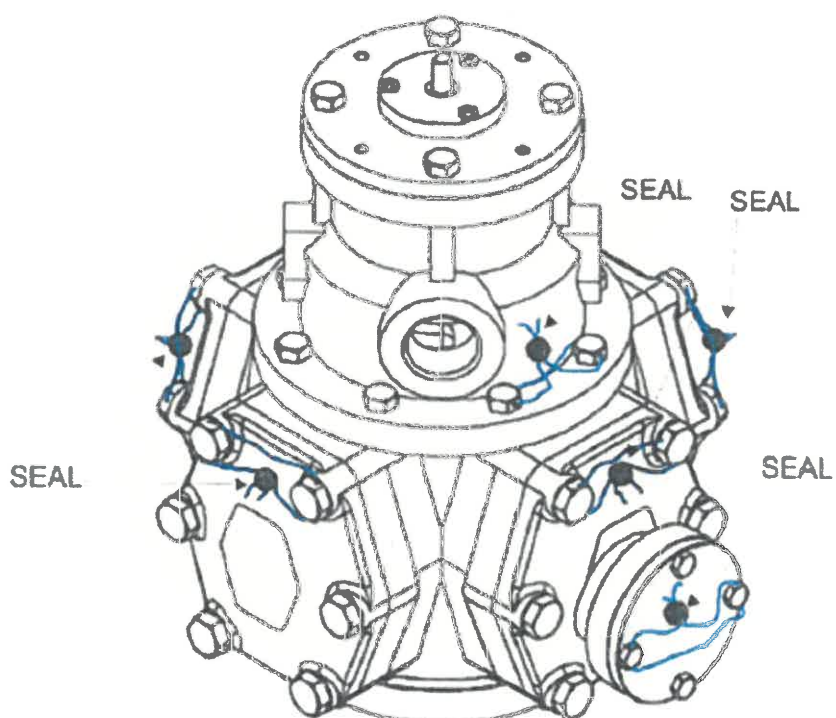
On the differential valve

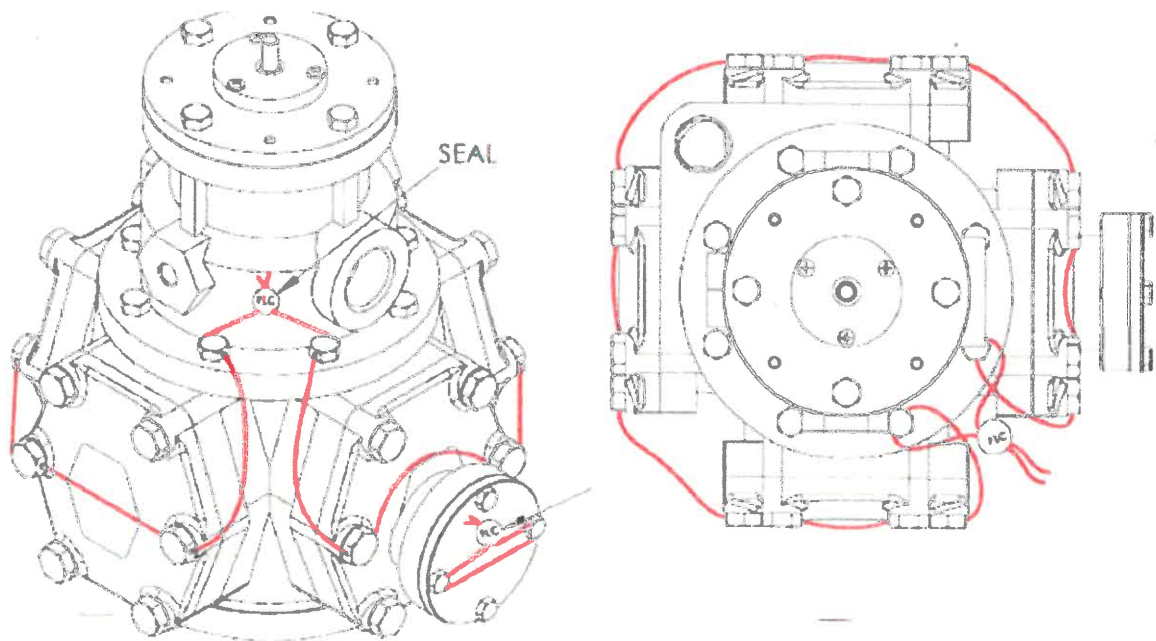
- Cover of the valve

On the dispenser:

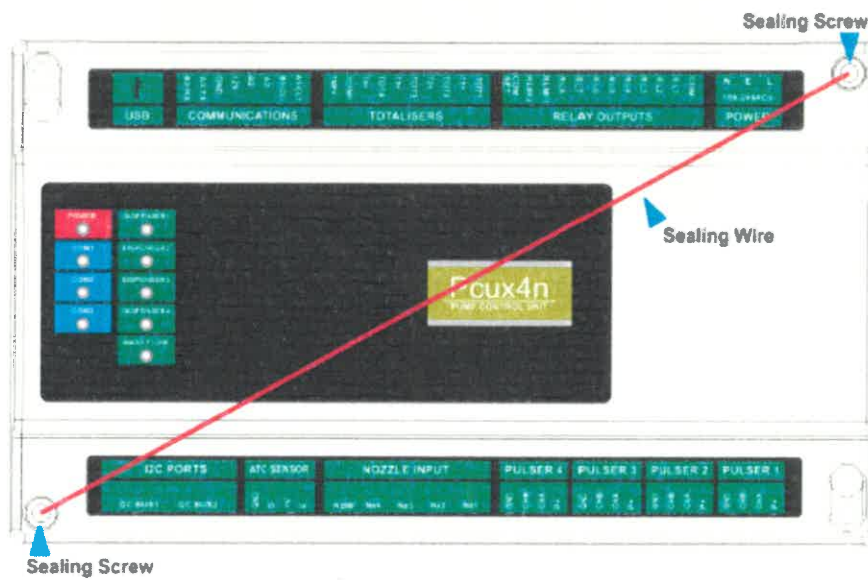
- Name plate

Picture No. 1: Sealing of the FLC4125 measurement sensor



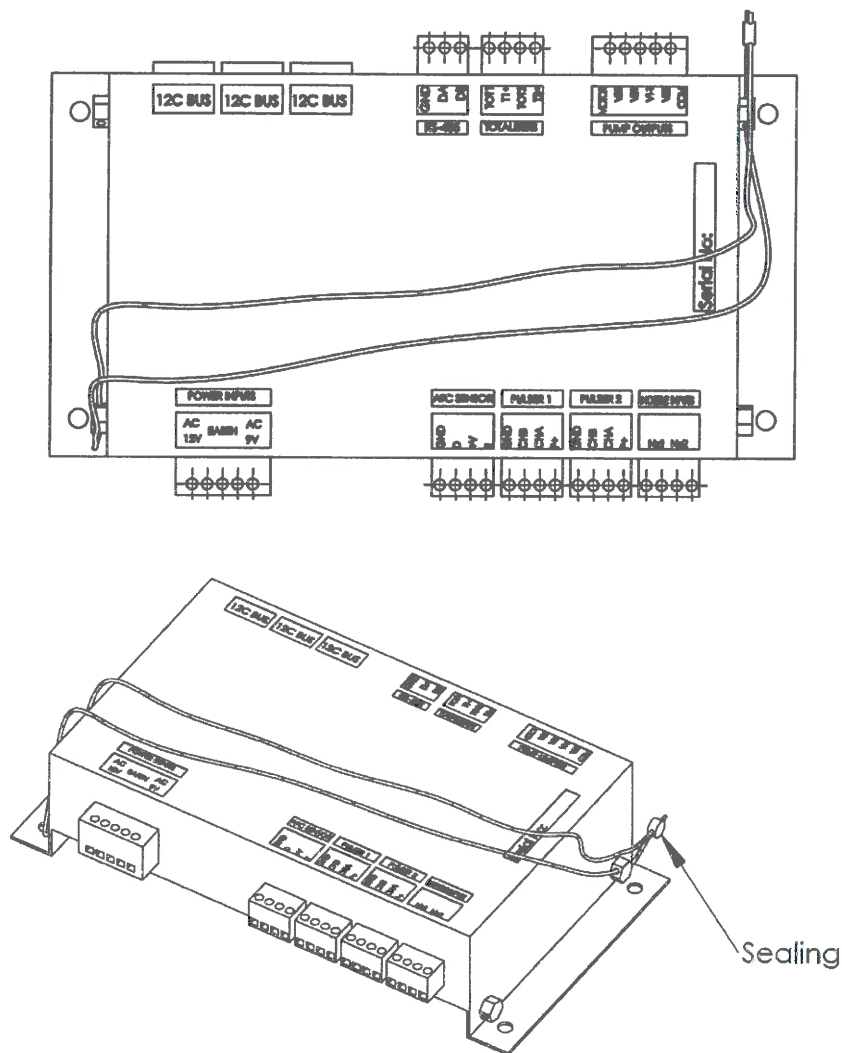


Picture No. 2: Sealing of the PCUXN electronic calculator

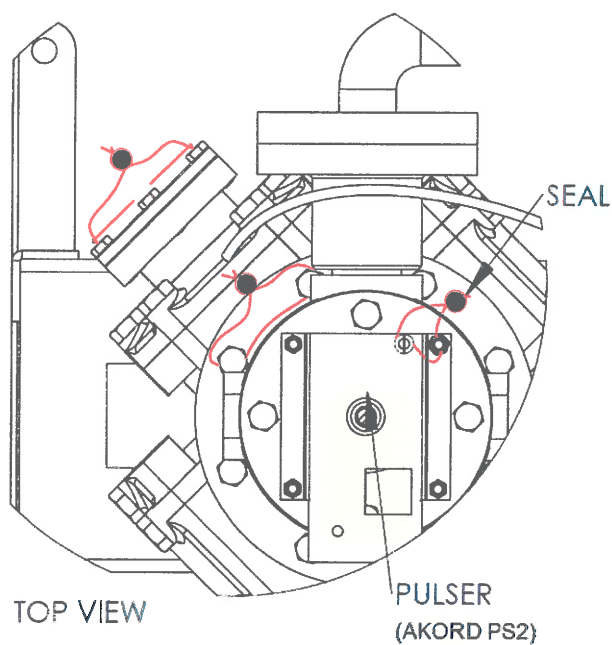




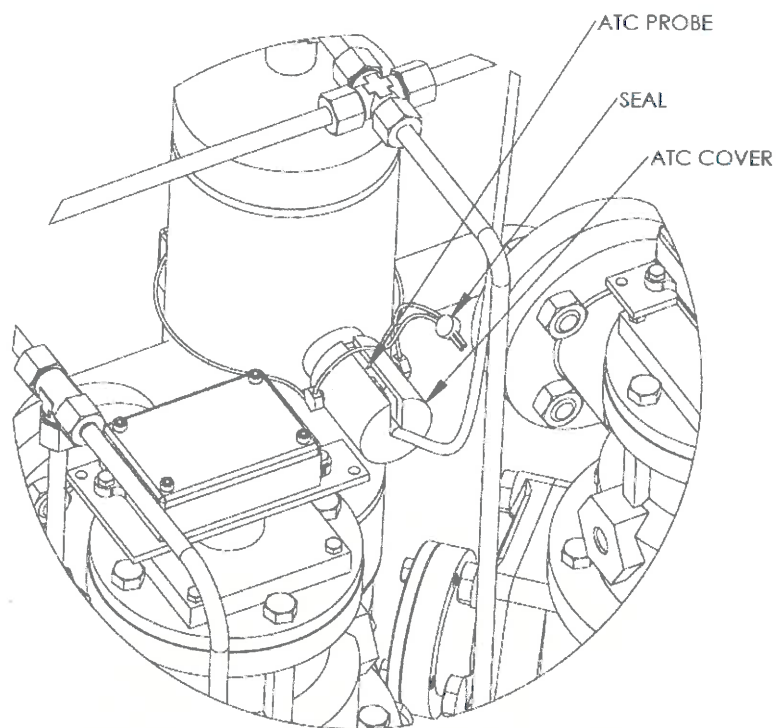
Picture No. 3: Sealing of the PCUX1 and MS2 calculator



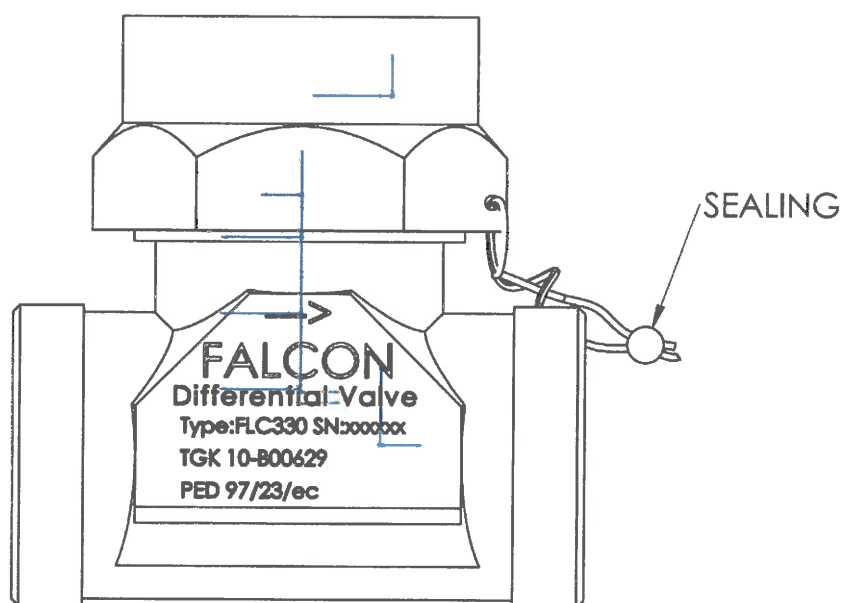
Picture No. 4: Sealing of the pulser



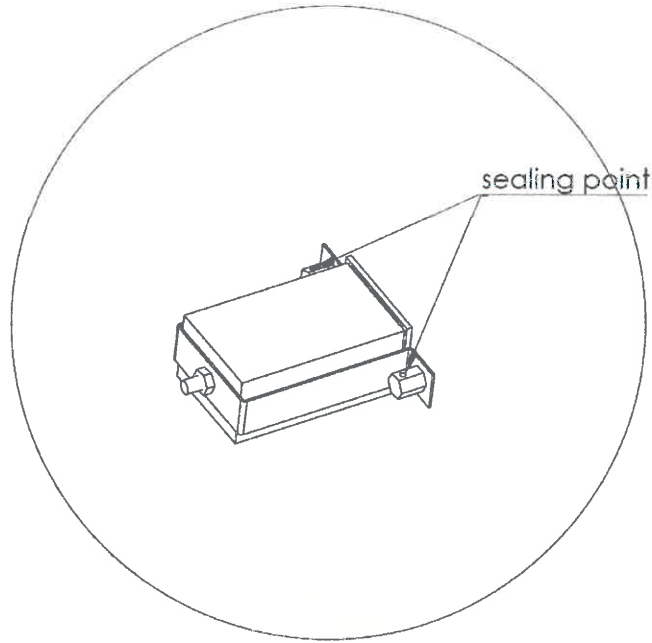
Picture No. 5: Sealing of the temperature probe and gas separator





Picture No. 6: Sealing of the differential valve



Picture No. 7: Sealing of the totalizer



Picture No. 8: Example of the name plate of the FALCON ARMA LPG dispenser

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İSTANBUL / TURKEY			
CERTIFICATE NO SERTİFİKA NO		ATEX CERTIFICATE ATEX SERTİFİKA	MID 2014/32/EU APP. NO. MID 2014/32/EU ONAY NO.
TECH. TESTING INSTITUTE AB ONAYLI KURULUŞ VE NO		IEP 17 ATEX 0545X	.....
LEFT SIDE		IEP NB 2284	RIGHT SIDE
1. NOZZLE	2. NOZZLE	 II 2G IIA T3  2284 EN 14678 - 1:2013	1. NOZZLE
			2. NOZZLE
MID ATC CERTIFIED:			
SELECTION OPERATION DENSITY	0.545 OR 0.560		
BASE TEMPERATURE	15°C		
TYPE / CİNSİ	DISPENSER		
CLASS / SINIFI	LPG		
ACCURACY / DOĞRULUK SINIFI	CLASS 1		
ELEKTROMAGNETIC CLASS	E1		
ELEKTROMANYETİK SINIF			
MECHANICAL CLASS	M1		
MEKANİK SINIF			
PRODUCTION PLACE	İSTANBUL / TURKEY		
TRADE MARK / MARKASI	FALCON		
MODEL	ARMA		
TYPE / TİP	11	12	14
SERIAL NUMBER & YEAR SERİ NO & YIL			
LIQUID DENSITY SIVI YOĞUNLUĞU	450 - 650 kg/m <sup>3</sup>		
Min. / Max. PRESSURE Min. / Max. BASINÇ	Pmin : 5 / Pmax : 16 bar		
WORKING TEMPERATURE ÇALIŞMA SICAKLIĞI	-25 °C / + 55 °C		
FLOWRATE RANGE DEBİ ARALIĞI	Qmin : 5 L/min - Qmax : 50 L/min		
CYCLIC VOLUME ÇEVİRİM HACMİ	0.5 L		
MIN. VOLUME / MIN. HACİM	5 L		
www.falconlpg.com			

Picture No. 9: Service key that serves to access administration and service menu of the MS2 and PCUx1 electronic calculator

