



EU-TYPE EXAMINATION CERTIFICATE

Number: TCM 141/17 - 5505

Addition 1

This addition replaces all previous versions of this certificate in full wording.

Page 1 from 11 pages

- 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:** fuel dispenser
Type: FALCON ARMA BD and FALCON ARMA COMBO BD-L
- Accuracy class: 0.5
Ambient temperature range [°C]: -25 to 55
- Valid until:** 24 September 2027
- Document No:** 0511-CS-A031-17
- Description:** Essential characteristics, approved conditions and special conditions, if any, are described in this certificate.
- Date of issue:** 14 February 2020

Certificate approved by:



RNDr. Pavel Klenovský

1 Measuring device description

The FALCON ARMA BD and FALCON ARMA COMBO BD-L fuel dispensers are designed for measurement of liquid fuel 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, small boats and small aircrafts.

The dispensers are produced under trademark Falcon.

This certificate covers all types of the ARMA BD series fuel 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 BD measuring system consists of a pumping unit with incorporated gas separator (optional), measurement transducer consisting of volumetric PD measurement sensor and pulse transmitter, solenoid valve, electronic calculator with indicating device and hose with dispensing nozzle.

This measuring system can be made as pressurized system in centrally pumped system or with external submersible pump. In that case the installation of a gas separator is NOT mandatory. If it is not intended to install a gas separator, the design of installation has to ensure that there is no risk of air intake or gas release and following requirements must be fulfilled:

- To secure automatically the minimum level in the storage tank, a level detection system shall be installed.
- Each delivery shall be delayed until the submerged pump has been running for at least 3 seconds.
- The pipelines between the pump unit and the dispenser are installed with a positive slope of at least 1 %. There shall be no significant portion without slope.
- At least one non-return valve shall be installed in the system upstream of each measurement transducer.

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 fuel dispenser series:

FALCON ARMA FUEL DISPENSER TYPES					
BRAND	MODEL	TYPE	NUMBER OF PRODUCT	NUMBER OF NOZZLE	NUMBER OF SIDE
FALCON	ARMA				
	ARMA - G	BD 111	1	1	1
	ARMA - H	BD 122	1	2	2
		BD 221	2	2	1
		BD 242	2	4	2
		BD 331	3	3	1
		BD 362	3	6	2
		BD 441	4	4	1
		BD 482	4	8	2

Model FALCON ARMA COMBO BD-L is a combination of fuel and LPG dispenser in one dispenser using the same calculator.

FALCON ARMA COMBO (FUEL + LPG) DISPENSER TYPES					
BRAND	MODEL	TYPE	NUMBER OF PRODUCT	NUMBER OF NOZZLE	NUMBER OF SIDE
FALCON	ARMA COMBO				
	ARMA - G COMBO	BD-L 221	2	2	1
		BD-L 242	2	4	2
		BD-L 331	3	3	1
		BD-L 362	3	6	2
		BD-L 441	4	4	1
	BD-L 482	4	8	2	

LPG measuring system has been certified previously by the EC-type examination certificate No. RO-2275-15264.

ATC conversion function:

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.

1.1. Pumping unit with gas separator

Manufacturer	Zhejiang Maide Machine
Pattern designation	ZCH-60
Maximum flow rate	50 L/min
Minimum pressure	1.8 bar
Applicable liquids	Diesels, Gasoline and similar products of the viscosity up to 6 cSt

1.2. Measuring sensor (flow meter)

Manufacturer	Sahin Hidrolik Makina Hirdavat Telekomunikasyon San. Tic. Ltd. Şti.
Pattern designation	TT250
Accuracy class	0.5
Minimum flow rate	5 L/min
Maximum flow rate	50 L/min
Minimum measured quantity	2 L
Liquid temperature range	(-5 to 35) °C
Cyclic volume	0.250 L / rev.
Liquids to be measured	Gasoline, Diesel, Kerosene and similar products
Approval certificate	ZR 141/17 - 0156

Positive displacement TT250 sensor uses the general principle of four pistons moving in steel sleeved cylinders and driving a crankshaft. One revolution of the crankshaft corresponds to volume of 0.25 litres.

TT250 measuring sensor is equipped with a mechanical adjustment device.

Accuracy of the sensor can be adjusted by a threaded adjustment bolt. This threaded adjusting bolt is used to adjust the amount of displacement of the piston. By the tightening and loosening of this bolt, the volume of the fluid passing through the sensor can be increased or decreased. The adjustment fix by a pin. The adjustment is continuous. Adjustment bolt consists of 4 quadrants. Each quadrant is equivalent of 0,003ml.

One revolution of the adjustment screw corresponds to approximately 1.1 % of accuracy. Maximum range of the adjustment is about ± 1.5 %. Location of the adjusting bolt is protected by a sealable cap.

1.3. 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

1.4. Calculator

Akord PCUXN electronic calculating / indicating device (calculator).

Manufacturer	Akord
Pattern designation	PCUX1N, PCUX2N, PCUX4N
Accuracy class	0.5
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

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.

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

Falcon F102 electronic calculating / indicating device (calculator).

Manufacturer	Sahin Hidrolik Makina Hirdavat Telekomunikasyon San. Tic. Ltd. Şti.
Pattern designation	F102
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
Compatible temperature probe	DS18B20
Approved Software versions	1.0.2
W&M checksum (CRC-32)	9A02BA99
Approval certificate	---

F102 calculator receives measured data in form of pulses from one, two pulse transmitters, converts them to the volume and displays measured values.

F102 – can control two 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. When you come to that kind of parameters, on the right down of display KEY symbol is appear.

The software version and check sum can be identify by the Pump menu and parameter 105 – information. To display checksum and version of calculator, push P2 / P3 up and down direction buttons.

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.

1.5. Hose

- Continental Conti Tech 559N; DN 3/4" and 5/8"; maximum length 5 m
- Trelleborg Volukler, DN 3/4" and 5/8"; maximum length 5m
- Elaflex; DN 3/4" and 5/8"; maximum length 5 m

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	0.5
Maximum flow rate Q_{max} [L/min]	50
Minimum flow rate Q_{min} [L/min]	5
Minimum measured quantity MMQ [L]	2
Liquids to be measured	Gasoline, Diesel, Kerosene and similar products
Liquid temperature range [°C]	-5 to 35
Ambient temperature range [°C]	-25 to 55
Maximum pressure [MPa]	0.30
Mechanical class	M1
Electromagnetic class	E1
Environmental class	H3
Type of display	electronic
Measurement unit	volume [L]
Smallest scale interval of the indication [L]	0.01
Approved software (check sum)	See point 1.4

3 Test

Technical tests and conformity assessment of the FALCON ARMA BD fuel 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 2019*.

Examination and tests results are described in the Test reports:

- No. 6015-PT-P0030-16 issued by Czech metrology institute (Notified Body No. 1383)
- No. 6015-PT-P0002-20 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, pumping unit with gas separator, 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 fuel 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 0.5
- 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 (ℓ 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.

Accuracy test within verification may be performed using any liquid fuel (such as gasoline, diesel etc.) or other liquid with similar characteristics, especially viscosity, 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 $\pm 0.5\%$.

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 5.

Seals:

On the TT250 measurement sensor:

- Bottom cover of the sensor
- Side piston covers of the sensor
- Cap of the adjustment screw
- 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 F102 electronic calculator:

- Cover of the CPU has to be sealed by two screws (picture No. 2)

On the ZCH-60 pumping unit

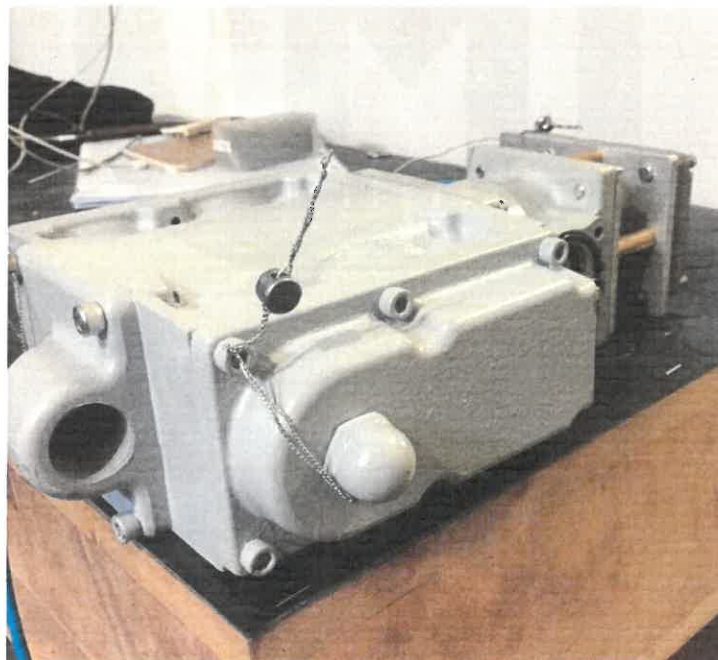
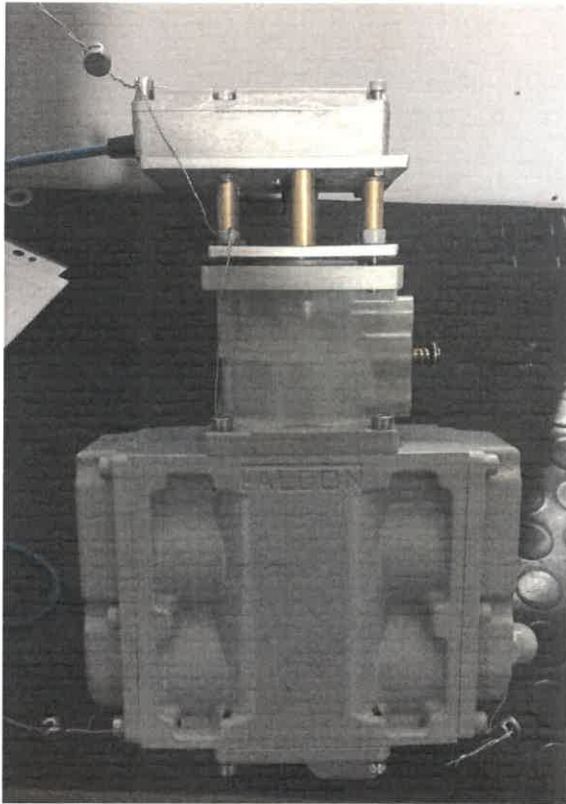
- Bypass valve and gas separator chamber (picture No. 3)

On the dispenser:

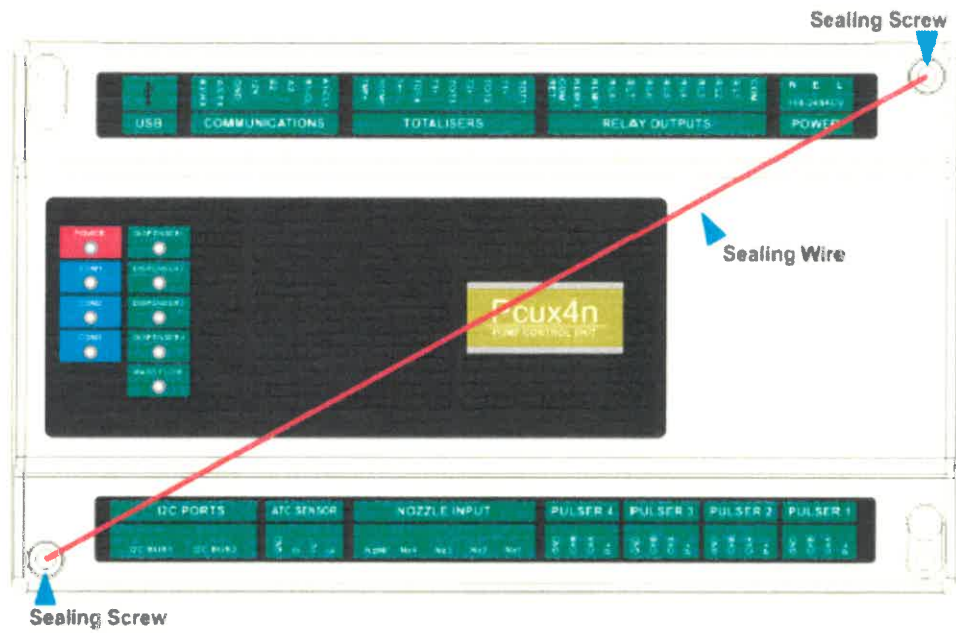
- Name plate
- Temperature probe (if installed) (picture No. 4)

In case of FALCON ARMA COMBO combined LPG and fuel dispenser, the LPG hydraulic part shall be sealed according to the EC-type examination certificate No. RO-2275-15264.

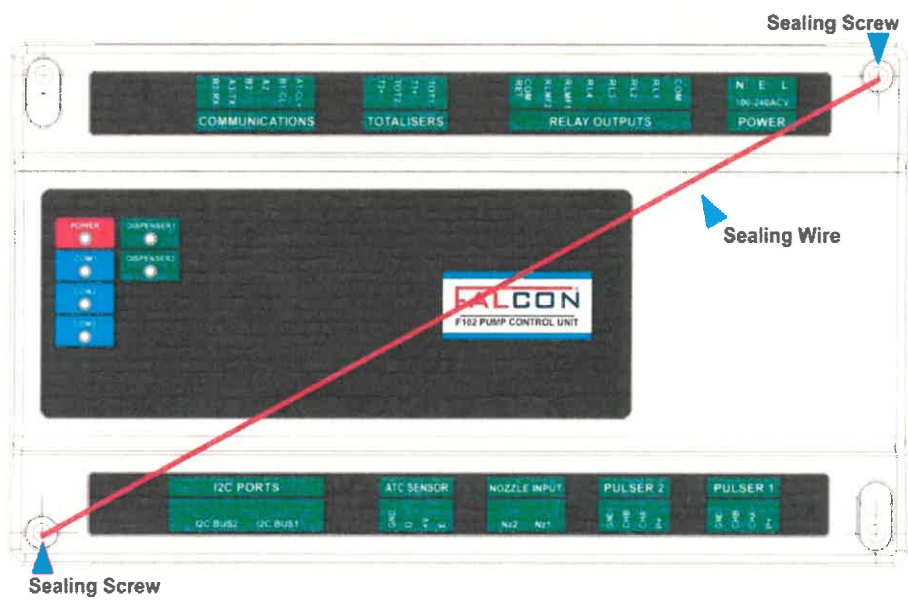
Picture No. 1: Sealing of the TT250 measurement sensor and pulser



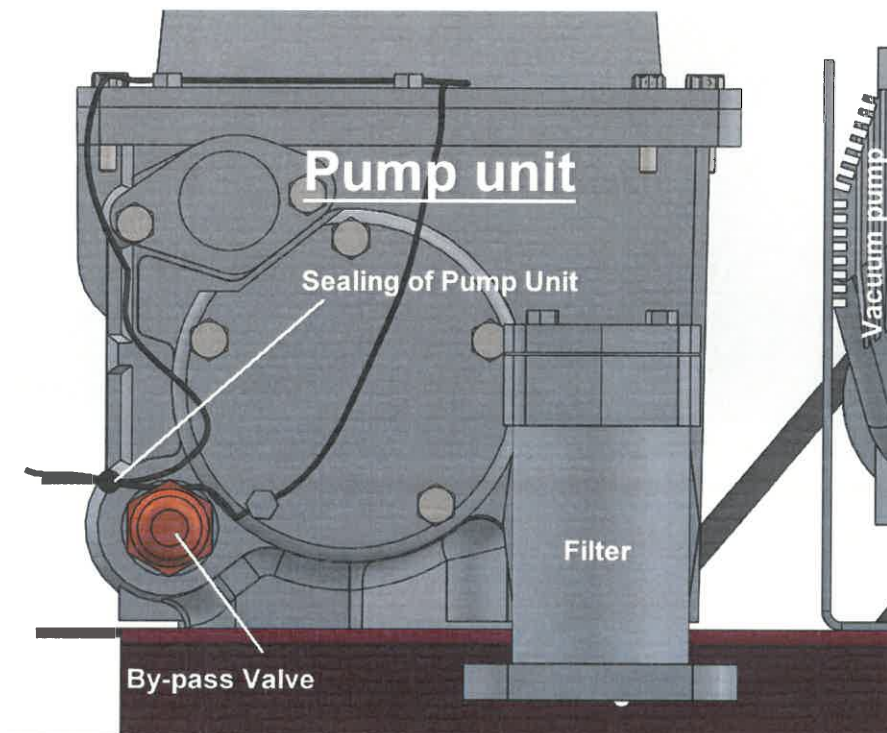
Picture No. 2: Sealing of the PCUXN electronic calculator



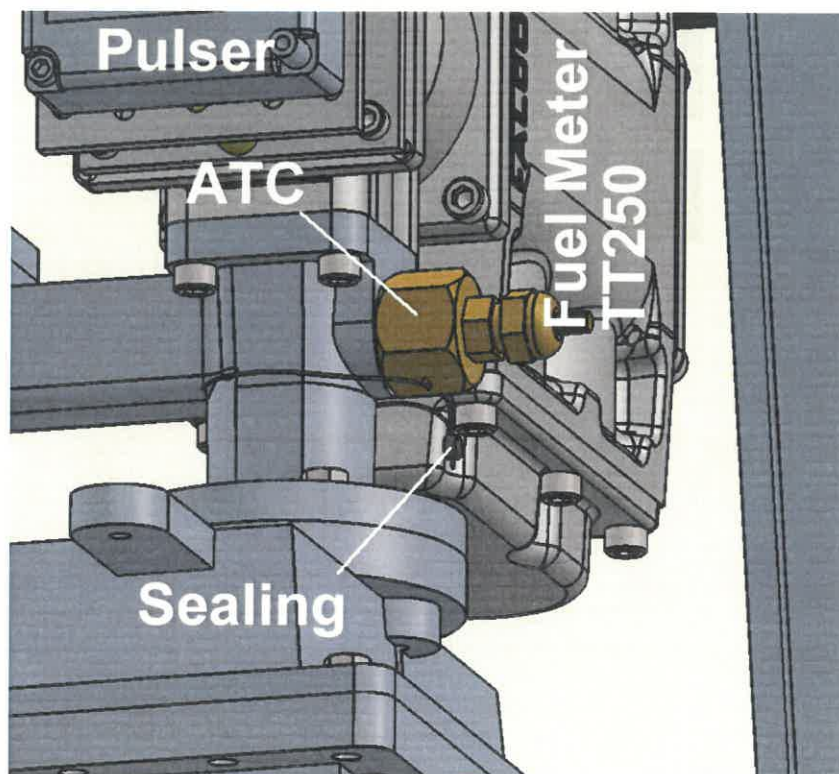
Picture No. 3: Sealing of the F102 electronic calculator









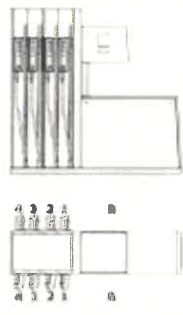






Picture No. 4: Sealing of the ZCH-60 pumping unit



Picture No. 5: Sealing of the temperature probe



Picture No. 6: Example of the name plate of the FALCON ARMA BD fuel dispenser

	Liquids, Petrol, Kerosen, Diesel Fuel and LPG ; Amb. Temp. -25°C to +55°C Accuracy Class of Fuel 0.5 Accuracy Class of LPG 1 Mechanical Class M1 Electromagnetic Class E1 Liquid Temp. of Fuel : -5°C / +35°C Liquid Temp. of LPG : -10°C / +50°C Un : 230VAC , 400VAC Pmax : 4kW																			
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