

UNISYST ENGINEERING LTD.

CF500

Gas Volume Correction Device



USER MANUAL

Version 2.0

Sofia, 2025

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1 INTRODUCTION

1.1 PRODUCT OVERVIEW

CF500 is a Type 1 gas volume correction device, configurable as a T, PT, or PTZ corrector. It is designed to compute the volume of gas under base conditions, based on measurement conditions such as volume, temperature, pressure, and compressibility. The volume information is received via a low-frequency input, compatible with any suitable gas flow meter providing this data.

CF500 represents a new generation of volume correctors designed for high-performance applications, thanks to its advanced electronic components. Its architecture is based on flash memory, which enables firmware updates via a laptop without hardware modifications. Communication is available through RS485 or GSM ports.

Power is supplied by an internal 3.6 V DC battery (17 Ah). When GSM communication is used, an additional internal 4.5 V DC battery is installed. For RS485 communication, an external power and barrier module (CF500-POW) is used, providing 5 V DC and protecting communication lines A and B. There is also a variant without communication ports, described in Section 1.3.

CF500 is certified in accordance with the European MID Directive and EN 12405-1 standard, and is suitable for commercial and financial gas transactions. The device bears markings according to the following directives:

2014/34/EU - ATEX Directive for explosive atmospheres

2014/32/EU - Measuring Instruments Directive (MID)

2014/30/EU - Electromagnetic Compatibility Directive (EMC)

1.2 OPERATING PRINCIPLE

The flow meter connected to CF500 measures the volume of gas under operating conditions—pressure and temperature. CF500 converts this measured volume to base conditions, according to EN 12405:

$$V_b = \frac{P}{P_b} \frac{T_b}{T} \frac{Z_b}{Z} V = \frac{P}{P_b} \frac{T_b}{T} \frac{1}{K_z} V = C \times V$$

- Where:
- V — Volume under operating conditions, m³;
- V_b — Converted volume under base conditions, m³;
- T — Measured gas temperature, K;
- T_b — Base temperature, K;
- P — Measured absolute gas pressure, bar;
- P_b — Base pressure, bar;
- Z — Compressibility at operating conditions;
- Z_b — Compressibility at base conditions;
- K_z — Compressibility correction factor— $K_z = \frac{Z}{Z_b}$;
- C — Total correction factor.

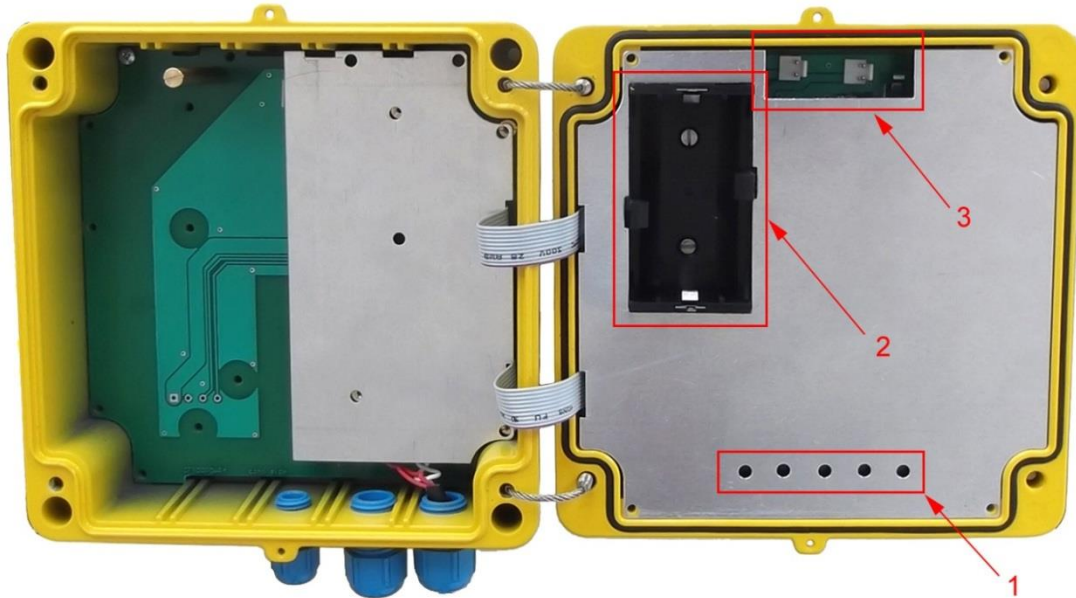
1.3 KEY FEATURES

Name	CF500-XYZ
Manufacturer	Unisyst Engineering Ltd.
Type	Type 1 Gas Volume Correction Device
Variants	CF500-XYZ X = T – Temperature sensor X = P – Temperature + Pressure sensors Y = G – GSM modem Y = R – RS485 module Y = N – No communication Z = P – External power supply for communication Z = N – Autonomous power
Metrology Compliance	EN 12405-1
Energy Calculation	EN 12405-2, System 2
MID Type Examination Cert.	BG-MI 002-15/01 by NB 2341
Compressibility Methods	• AGANX19 mod. • SGERG 88 • AGA8-92DC • Constant K_z
Ambient Temp Range	–25 °C to +55 °C
Gas Temp Range	–25 °C to +55 °C
Base Pressure / Temp	$P_b = 1.01325 \text{ bar}$ $T_b = 20 \text{ °C}$
Protection Class	IP67 (EN 60529)
Power Supply	3.6 V DC internal battery (17 Ah) 4.5 V DC internal GSM battery 5 V DC external (RS485)
Pressure Sensors Range	0–10 bar 3–20 bar 0.8–2 bar IPS-A-..., SM Sensormatic Ltd.
Temperature Sensor	Class A (EN 60751) ITS-Pt1000-A-..., SM Sensormatic Ltd.
Frequency Input	Low-frequency (max 2 Hz)
Cable Lengths	Low freq: 0.8 m or 2.5 m Pressure 0.8 m or 2.5 m Temperature: 0.8 m or 2.5 m
CE Marking	Compliance with: Directive 2014/34/EC (ATEX) Directive 2014/32/EC (MID) Directive 2014/30/EC (EMC)
Electromagnetic class	E2
Mechanical class	M2

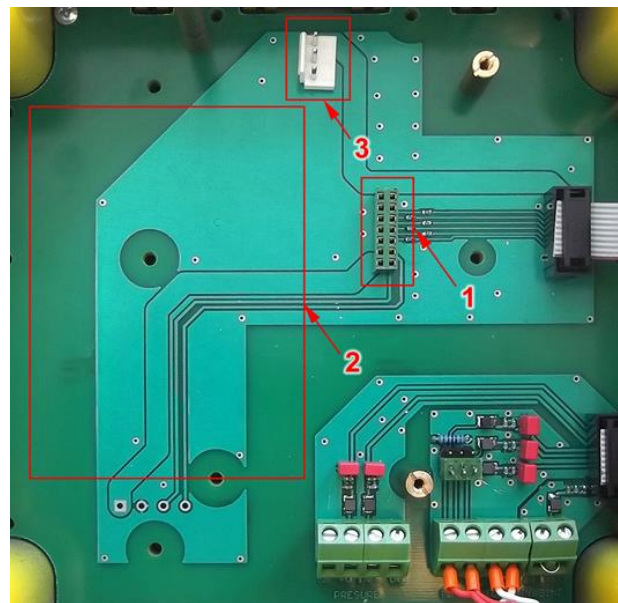
Humidity	Designed for humid conditions with condensation
ATEX Classification	II 2 G Ex ib IIB T4 Gb
Corps	Housing Material – Aluminium Dimensions (mm) – 165 x 165 x 88 Weight ~ 2 кг
Display	GDC-FR-3809WP
Keyboard	5 internal buttons
Communication Ports	RS485 or GSM
Communication Protocols	Modbus RTU (slave mode)
Gas Types	Natural gas, fuel gases (1st and 2nd category per EN 437)
Units of Measurement	Pressure: bar Temperature: °C Volume: m ³ Energy: kWh, GJ
Firmware Compliance	Compatible with WELMEC 7.2, according to the following: 'P' : embedded software 'I' : specific requirements gas corrector 'L' : long-term data storage
Hardware Boards	1 CPU board: analog measurements metrological core non- metrological applications 1 I/O board: 1 Communication board (RS485 or GSM)

2 PRODUCT OVERVIEW

The CF500 housing consists of two interconnected sections via flexible cables. When the connecting screws are removed, the casing opens entirely, giving easy access to essential components such as the internal battery, terminals, and buttons.



1. Functional buttons
2. Slot for internal battery
3. Two connectors for battery connection



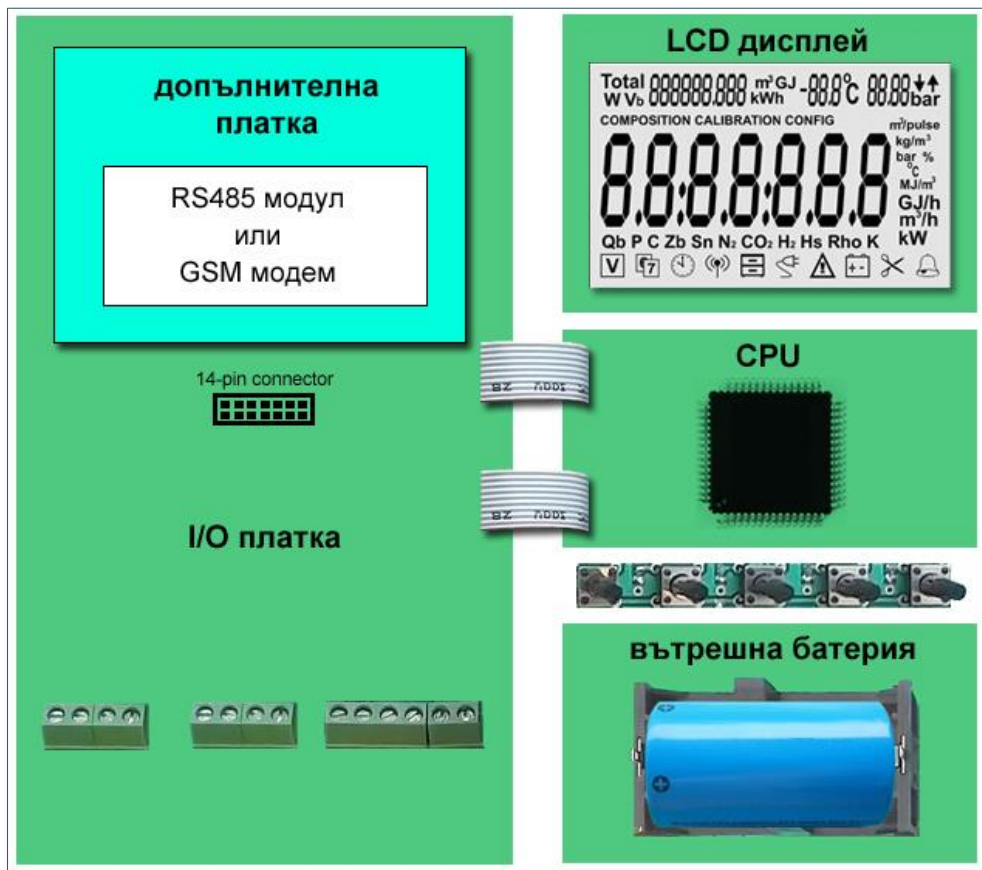
1. Connector for communication modules
2. Space for additional GSM battery block
3. Connector to GSM battery block

On the front panel, there's a specialized LCD screen for data display. Two light-sensitive sensors at both ends of the display control how information is shown when the device is active. A tamper-proof label is affixed on the outer shell, and under the front cover, you'll find the battery slot and connectors. Battery replacement does not break the device's legal verification seals.

2.1 HARDWARE ARCHITECTURE

The CF500 features two primary electronic boards:

- CPU Board - Includes the core system components: microcontroller, RAM, Flash memory, LCD display, internal battery;
- I/O Board - Hosts inputs for pressure, temperature, low-frequency flow, and connection ports for RS485 or GSM communication modules.

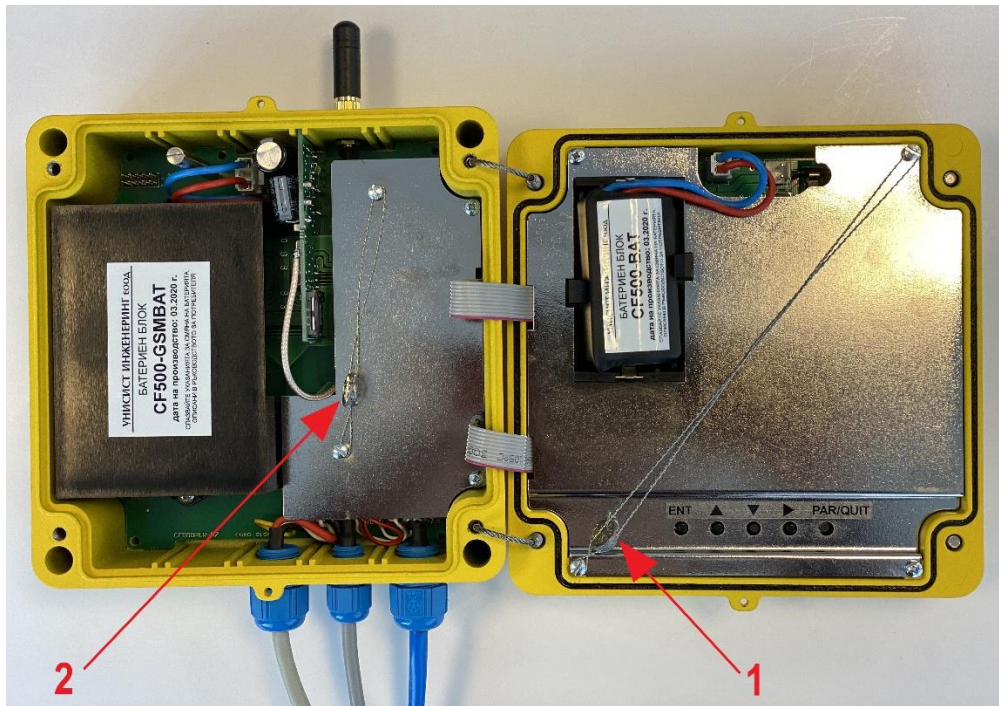


2.2 METROLOGICAL SEALING SCHEME

Metrological seals protect access to:

- All certified measurement components;
- Connections between sensors and flow meters;
- The "calibration switch," which grants access to calibration mode.

Standard sealing includes two sealed plates—one over the processor and one covering the metrological I/O section. These plates feature slots for inspection stamps as shown below:



1. metrological board 1 protected with a metrological seal
2. metrological board 2 protected with a metrological seal



- 1 and 2. places for placing inspection markings

2.3 CUSTOMER SEALING

In addition to regulatory seals, non-metrological (customer) seals can be added to restrict internal access. These seals are placed on designated tabs on both casing sections. Any attempt to open the enclosure leaves visible tamper evidence.

Customer seals protect access to:

- Non-metrological interfaces
- Battery compartment.



customer sealing

2.4 METROLOGICAL LABEL

Affixed externally, the metrological label includes:

- Product name (e.g. PTZ gas volume corrector CF500);
- Manufacturer's name;
- Serial number and manufacturing date;
- CE marking;
- MID certification details;
- Maximum permitted error under base conditions;
- Base pressure and temperature values;
- Environmental operating range;
- ATEX compliance details;
- IP protection rating.



3 METROLOGICAL VALUES

All metrological values are measured or calculated every second if the display is active or if there are pulses at the input. Otherwise, calculations are performed at intervals from 5 to 250 seconds, configurable by the user.

3.1 INPUT VARIABLES

Measured variables such as temperature, pressure, and uncorrected volume are received via analog or digital inputs in the form of electrical signals (resistance, voltage, number of pulses). Each signal is validated—e.g., for pressure sensors with 0.1–3 V range, voltage must stay within bounds.

If a signal is valid, it's converted into a digital value. Otherwise, the device uses a predefined default nominal value until the input recovers.

3.1.1 Temperature

CF500 uses a Pt1000 Class A temperature sensor in compliance with IEC/EN 60751. The sensor utilizes a four-wire connection to eliminate lead resistance..

- Protection: IP67 per EN 60529;
- Cable lengths: 0.8 m or 2.5 m;
- Measurement range: –20 °C to +50 °C;
- An alarm is triggered if readings fall outside thresholds or if the sensor channel fails.

3.1.2 Pressure

T-Type Corrector

Uses fixed pressure, calculated as:

$$P_a = P_{atm} + P$$

where:

- P_a – fixed absolute pressure;
- P_{atm} – atmospheric pressure corresponding to the attitude where the device is intended to be installed;
- P – fixed value of the gas overpressure.

PT / PTZ Correctors

Use an external absolute pressure sensor:

- Stainless-steel casing, IP66 protection;
- Overload capacity: $\geq 1.2 \times$ max pressure for 15 minutes;
- Cable lengths: 0.8 m or 2.5 m;
- Alarms triggered when pressure is out of range or sensor fails.

3.1.3 Low-Frequency Input

CF500 features a low-frequency (LF) input:

- Max frequency: 2 Hz;
- Minimum pulse: 65 ms;
- Minimum pause: 130 ms.

Compatible with:

- Dry contact switches;
- Static relays;
- Open collectors.

Terminal connections: K3/1 and K3/2.

3.2 CALCULATION OF GAS COMPRESSIBILITY CORRECTION FACTOR

The CF500 calculates the compressibility correction factor (K_{Z}) using one of the following methods:

Method	Description
AGA NX19 mod.	Modified AGA NX19 method
SGERG 88	GERG 88 method (Simplified Gas Equation)
AGA8-92DC	Detailed Characterization per AGA8
Constant	Fixed user-defined value $K_z = Z / Z_b$

Depending on configuration:

- T-type or PT-type correctors use a constant value for compressibility factor, entered during device setup.
- PTZ-type correctors require specifying which calculation method is used, with corresponding gas parameters input into the device.

When configured as a T or PT corrector, the CF500 uses a constant value for the compression correction factor K_z . This value is entered during configuration.

When configuring us a PTZ correctorq it is also necessary to specify the method for calculating the compressibility coefficient Z и Z_b . Depending on the selected method, the following data is required and must be entered into device:

	AGA NX19 mod.	SGERG 88	AGA8-92DC	Constant K_Z
%CO ₂	✓	✓		
%N ₂	✓			
%H ₂		✓		
Calorific Value H_s		✓		
Density	✓	✓		
Full Gas Composition			✓	
Constant K_Z				✓

Application Ranges

AGA NX19 mod.

Absolute Pressure:	$0 \text{ MPa} < P < 12 \text{ MPa}$	$0 < P < 120 \text{ bar}$
Temperature:	$250 \text{ K} < T < 340 \text{ K}$	$-23.15 \text{ °C} < T < 66.85 \text{ °C}$

gas parameters – AGA NX19 mod		
$0 <$	CO ₂ (%)	< 30
$0 <$	N ₂ (%)	< 50
$0.55 <$	relative density	< 0.9

SGERG 88

$0 \text{ MPa} < P < 12 \text{ MPa}$	$0 < P < 120 \text{ bar}$
$263 \text{ K} < T < 338 \text{ K}$	$-10.15 \text{ °C} < T < 64.85 \text{ °C}$
$30 \text{ MJ/m}^3 < H_s < 45 \text{ MJ/m}^3$	

gas parameters – SGERG 88		
$0 <$	CO ₂ (%)	< 30
$0 <$	H ₂ (%)	< 10
$0.55 <$	relative density	< 0.9

AGA8-92DC

Absolute Pressure:	$0 \text{ MPa} < P < 12 \text{ MPa}$	$0 < P < 120 \text{ bar}$
Temperature:	$263 \text{ K} < T < 338 \text{ K}$	$-10.15 \text{ }^{\circ}\text{C} < T < 64.85 \text{ }^{\circ}\text{C}$
gross calorific value	$30 \text{ MJ/m}^3 < H_s < 45 \text{ MJ/m}^3$	

gas parameters – AGA8-92DC												
70 <	CO ₄ (%)	< 100			0 <	C ₄ H ₁₀ (%)	< 1.5			0 <	H ₂ (%)	< 10
0 <	N ₂ (%)	< 20			0 <	C ₅ H ₁₂ (%)	< 0.5			0 <	CO (%)	< 3
0 <	CO ₂ (%)	< 20			0 <	C ₆ (%)	< 0.1			0 <	He (%)	< 0.5
0 <	C ₂ H ₆ (%)	< 10			0 <	C ₇ (%)	< 0.05			0 <	H ₂ O (%)	< 0.015
0 <	C ₃ H ₈ (%)	< 3.5			0 <	C ₈₊ (%)	< 0.05			0.55 <	relative density	< 0.8

If any input variables fall outside these ranges, CF500 triggers a metrological alarm. While alarms persist, K_z calculation continues using default values.

3.3 CALCULATION OF TOTAL CORRECTION FACTOR

The CF500 calculates the total correction factor in accordance with the formula defined in EN 12405-1:

$$C = \frac{P}{P_b} \frac{T_b}{T} \frac{Z_b}{Z} = \frac{P}{P_b} \frac{T_b}{T} \frac{1}{K_z}$$

The base pressure and base temperature must be entered into the device before commissioning. The base temperature (t_b) is entered in $^{\circ}\text{C}$.

$$T_b = t_b + 273.15$$

where:

T_b – absolute base temperature, K;

t_b – base temperature, $^{\circ}\text{C}$.

3.4 TOTALIZERS

The CF500 accumulates the following totalizers (counters):

Totalizer Type	Description
Uncorrected Volume	Based on incoming pulses from the low-frequency flow meter input
Corrected Volume	Volume adjusted to base conditions using the correction factor
Energy	Computed using corrected volume and calorific value
Overall Corrected Volume	Includes all corrected volume regardless of alarm status
Overall Energy	Includes all energy totals regardless of alarm status
Alarm Uncorrected Volume	Accumulated when a metrological alarm is active
Alarm Corrected Volume	As above but for corrected values
Alarm Energy	As above but for energy totals

3.4.1 Uncorrected Volume Totalizer

The pulses received from the flowmeter at the low-frequency input are multiplied by the flowmeter constant:

$$V = N_{\text{imp}} \times C_t$$

where:

- V – uncorrected volume, m³;
- N_{imp} – number of received pulses;
- C_t – input pulse weight (flowmeter constant), m³/pulse.

The pulse constant is configurable, from 0.001 m³/pulse to 100 m³/pulse. The result is added to the uncorrected volume totalizer..

3.4.2 Corrected Volume Totalizer

Corrected volume is calculated as:

$$V_b = V \times C$$

where:

- V_b – adjusted volume at baseline conditions, m³;
- V – unadjusted volume, m³;
- C – correction factor.

Added to the corrected volume totalizer.

3.4.3 Energy Totalizer

Energy W is computed per EN 12405-2 as:

$$W = V_b \times Hs \times \text{coeff}$$

where:

W – energy, kWh;

V_b – corrected volume, m³;

Hs – calorific value of gas, MJ/m³;

coeff – conversion factor to kWh.

Energy totals are accumulated in kWh by default for precision, but can be displayed in GJ depending on user settings.

3.4.4 Totalizer Control Logic

Depending on the presence or absence of a metrological alarm, the totalizers are controlled as indicated in the table according to EN 12405-1:

	normal operation	alarm operation	totalizer type
Uncorrected Volume	Increases	Increases	Metrological
Corrected Volume	Increases	Paused	Metrological
Energy	Increases	Paused	Metrological
Overall Corrected Volume	Increases	Increases	Non-metrological
Overall Energy	Increases	Increases	Non-metrological
Alarm Uncorrected Volume	Paused	Increases	Non-metrological
Alarm Corrected Volume	Paused	Increases	Non-metrological
Alarm Energy	Paused	Increases	Non-metrological

* In case of an alarm, quantities are computed using nominal values for pressure and temperature defined during device setup.

4 NON-METROLOGICAL VALUES

At each measurement interval, CF500 calculates the following indicative (non-certified) flow rates:

Uncorrected Flow

Instantaneous flow before correction:

$$Q = \frac{N_{\text{imp}} \times C_t}{\text{period}} 3600$$

where:

Q – current unadjusted cost, m³/h;

- N_{imp} – number of received pulses for the period;
 C_t – input pulse weight (flowmeter constant), m³/pulse;
 period – duration of time between two measurements, s.

Corrected Flow

The adjusted cost is calculated using the formula:

$$Q_b = Q \times C$$

where:

- Q_b – cost under baseline conditions, m³/h;
 Q – моментен некоригиран разход, m³/h;
 C – correction factor.

Energy Flow

Calculated energy flow in kilowatts or gigajoules/hour:

$$P = Q_b \times Hs \times \text{coeff}$$

where:

- P – energy expenditure, kW;
 Q_b – volume adjusted consumption, m³/h;
 Hs – calorific value of gas, MJ/m³;
 coeff – coefficient that converts the unit of measurement to kW (if necessary).

Energy flow is computed in kW for precision, but can be displayed in GJ/h depending on configuration settings.

These values are for informational use only and do not carry metrological certification.

5 COMMUNICATION

CF500 enables communication with external devices via either an RS485 port or GSM modem, based on which module is installed in the I/O board expansion slot.

- GSM modem CF500-GSM. Accordingly, the corrector variant is designated as CF500-PG;
- RS485 board and external module CF500-POW. Accordingly, the corrector variant is designated as CF500-PRP.

5.1 GSM MODULE

- Installed internally in the expansion slot
- Suitable for use in hazardous (ATEX) zones
- Powered by an internal CF500-GSMBAT 4.5V DC battery
- GSM signal transmitted via a safe external antenna mounted on the CF500 casing
- Uses Modbus RTU protocol in slave mode.

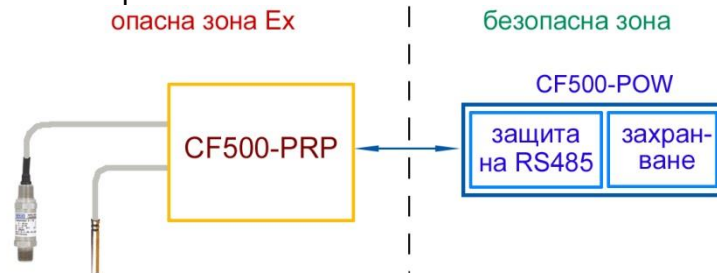


CF500 with installed GSM board and external antenna

Variant with GSM modem is labeled CF500-PG.

5.2 RS485 MODULE

- Installed internally in the expansion slot
- Also suitable for use in ATEX zones
- Connects to external devices via specialized CF500-POW module placed outside the hazardous area
- CF500-POW ensures safe electrical isolation and supplies stable 5V DC power to the RS485 lines (A and B)
- Uses Modbus RTU protocol in slave mode



CF500 with RS485 board installed and CF500-POW external module

The RS485 modem communicates via Modbus RTU protocol in slave mode.

The user can select the baud rate and other communication parameters in the device configuration mode.

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6 INSTALLATION, COMMISSIONING & MAINTENANCE

6.1 INSTALLATION

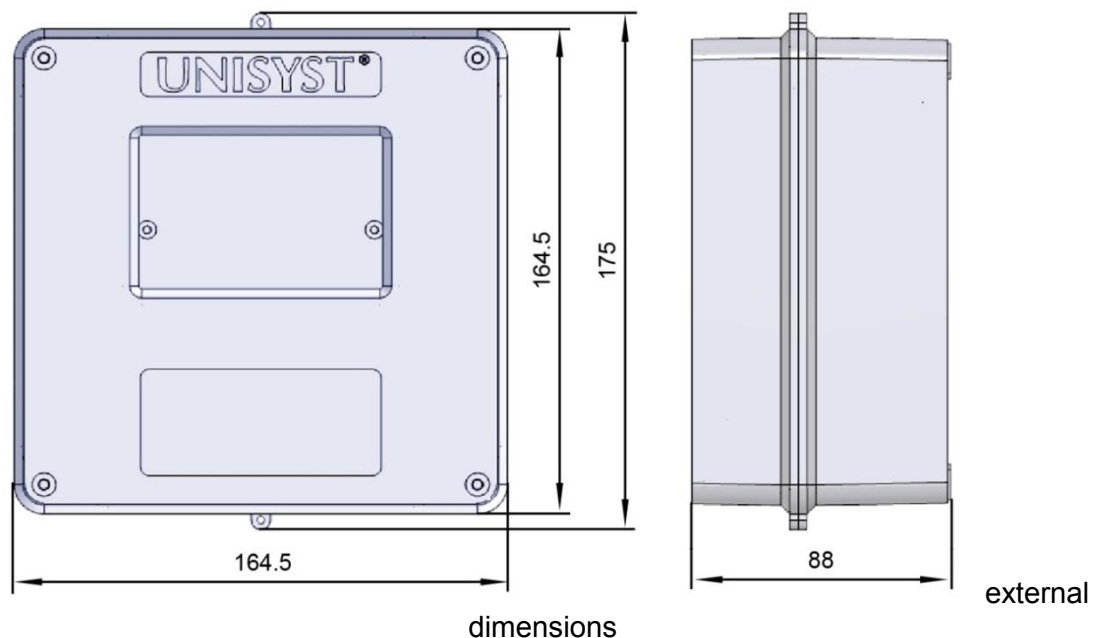
After delivery, perform a visual inspection to check for:

- Mechanical damage
- Missing components

If any issue is found, return the device for servicing.

If the device has been exposed to extreme temperatures during storage or transport, allow it to acclimate for at least 4 hours before use.

CF500 arrives fully assembled, with accessories depending on the ordered configuration.



Mounting Requirements:

- Install away from heat sources and strong electromagnetic interference.
- Use brackets or wall plates to route cables properly.
- Cables should be supported and not hang directly from the device.

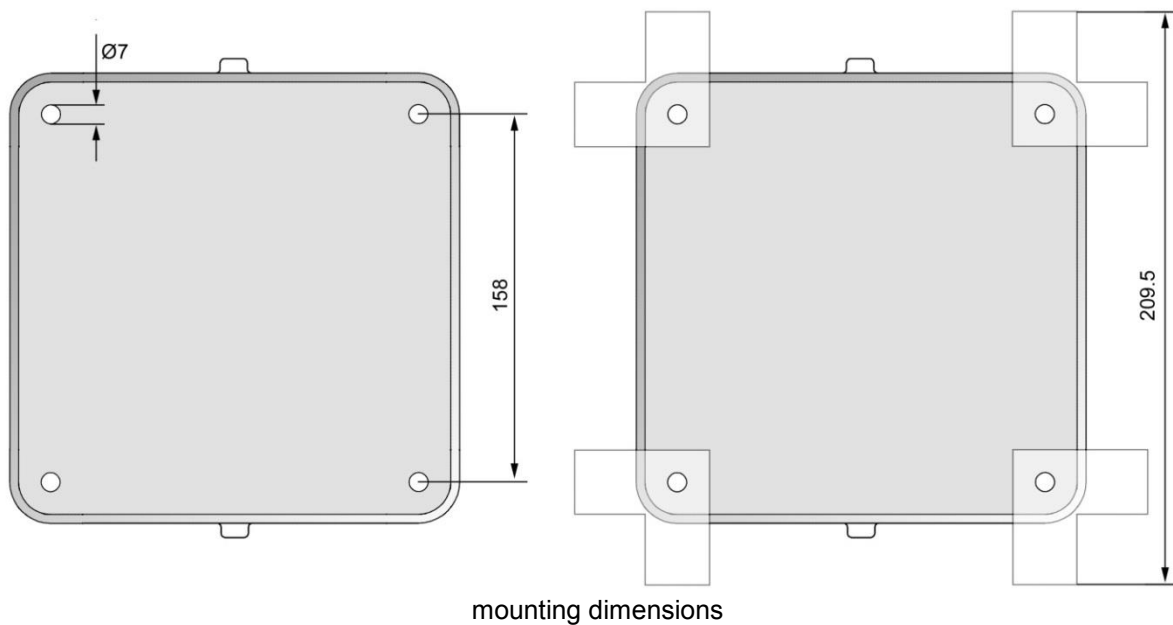
Post installation:

- Secure all four screws in each corner of the device to ensure waterproof sealing.
- Tighten all cable fittings to maintain IP protection.

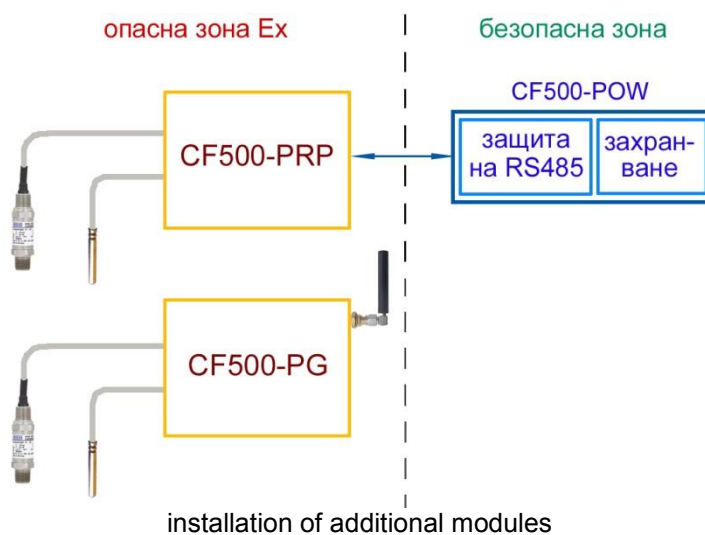
Mounting Options:

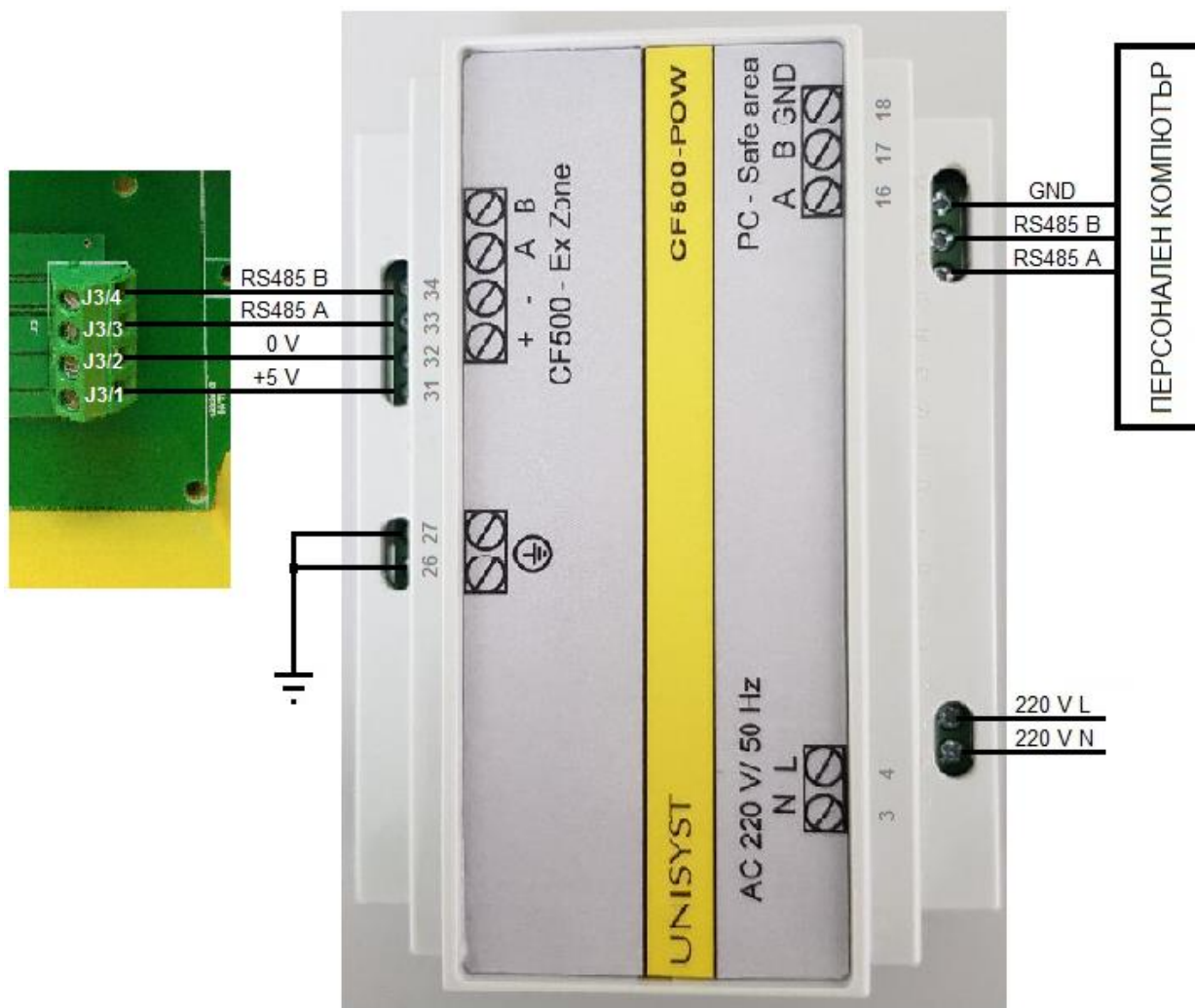
- Wall-mounted or on a panel
- IP65 protection allows outdoor installation, preferably under cover or inside a cabinet.

Four mounting holes (Ø 7 mm) are available. Use screws up to 5 mm in diameter. Optional mounting brackets may be used.



6.2 INSTALLATION OF ADDITIONAL MODULES





CF500-POW (RS485 power module): 105 × 86 × 57 mm

Mounts on a standard DIN rail (EN 50022).

CF500 Device Terminal Table:

Terminal	Signal	Description
J3/1	+5 V	Power supply
J3/2	0 V	Ground
J3/3	RS485 A	Communication line
J3/4	RS485 B	Communication line

CF500-POW Module Terminal Table:

Terminal	Signal	Description
3	220 V N	Mains neutral input
4	220 V L	Mains live input
16	RS485 A (to a personal computer)	Comm line to PC
17	RS485 B (to a personal computer)	Comm line to PC
18	GND (to a personal computer)	Ground to PC
26	Connect to ground	Connect to ground
27	Connect to ground	Connect to ground
31	+5 V (to CF500)	Power output to CF500
32	0 V (to CF500)	Ground to CF500
33	RS485 A (to CF500)	Comm line to CF500
34	RS485 B (to CF500)	Comm line to CF500

6.3 SENSOR CONNECTION DIAGRAM

Below is the wiring layout for connecting pressure, temperature, and flow sensors to CF500.



Sensor Terminals

Terminal	Signal	Value Range	Description
K1/2	+U Transmitter P	5 V	Common ground
K1/3	+In Transmitter P	0.1 ÷ 3 V	Temperature sensor connection
K1/4	- Transmitter P		Temperature sensor connection
K2/1	Pt1000 - 1		Temperature sensor connection
K2/2	Pt1000 - 2		Temperature sensor connection
K2/3	Pt1000 - 3		Low-frequency pulse input (-)
K2/4	Pt1000 - 4		Low-frequency pulse input (+)
K3/1	- Pulses from turbine		Common ground
K3/2	+ Pulses from turbine		Temperature sensor connection

These connections ensure precise reading of flow, pressure, and temperature values from external sensors.

6.4 SENSOR INSTALLATION

6.4.1 Temperature Sensor

Temperature Sensor must be placed inside a protective sleeve on the pipe where the measured temperature accurately reflects gas temperature at the flow meter.

Recommended setup:

- Distance from flow meter: less than 1 meter
- Position: downstream of the gas flow
- Immersion depth: between one-third and two-thirds of the pipe's internal diameter

It's advisable to install a second thermowell nearby to validate measurements with a reference thermometer, without removing the main sensor

6.4.2 Pressure Sensor

Equipped with a connector featuring external threads.

Installed by:

- Direct mounting (possibly with adapter)
- Or via a 3-way valve, which simplifies periodic sensor verification

6.4.3 Flow Meter Connection Cable

The **low-frequency cable** supplied with CF500 should be directly connected to the LF output of the gas flow meter.

6.5 POWER SUPPLY & BATTERY REPLACEMENT INSTRUCTIONS

CF500 devices are shipped with the following power supply configurations:

Configuration	Description
CF500-BAT	Internal battery block (default setup)
CF500-BAT + CF500-GSMBAT	Internal battery for device + additional battery for GSM modem
CF500-BAT + CF500-POW	Internal battery + external RS485 power module

Important Guidelines:

- **Use only the manufacturer-certified power sources, which are ATEX-compliant and meet metrological requirements.**
- **Warranty is valid only when using the specified power supplies.**

Internal Battery – CF500-BAT

- Type: 17 Ah lithium battery (D-size), 3.6 V DC
- Includes all intrinsic safety protections
- Provides up to 5 years autonomous operation under typical load
- Battery life may reduce with heavy display usage or continuous GSM communication
- When battery capacity reaches 90%, a warning icon flashes on display. The event is logged in the alarm archive.



main power supply unit CF500-BAT

Replacement Procedure:

- Confirm new battery voltage exceeds 3.6 V
- Open the CF500 enclosure
- Connect the new battery to the available battery connector
- Disconnect and remove the old battery
- Insert the new battery into its holder
- Close the enclosure and verify device operation

Caution: Do NOT short-circuit the battery block-this will permanently damage it.

GSM Modem Battery – CF500-GSMBAT

- When GSM communication is active, CF500 uses an additional 4.5 V DC internal battery to power the GSM module.
- Includes intrinsic safety protections
- Cannot be replaced with a different type
- Battery warning shown at 90% depletion, and event logged accordingly

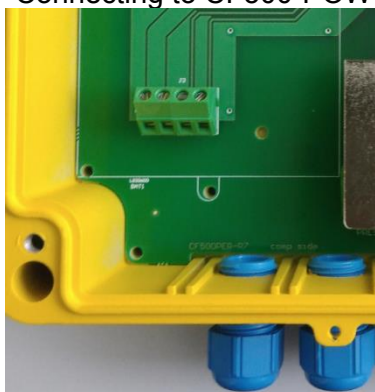


additional power supply unit CF500-GSMBAT

- External Power for RS485 – CF500-POW

- For RS485 communication, CF500 is bundled with the CF500-POW external safe module, which:
 - Supplies 5 V DC to RS485 module
 - Electrically isolates the RS485 serial interface (lines A & B)
 - Includes all required intrinsic safety measures
 - Cannot be substituted by any other type

Connecting to CF500-POW



6.6 COMMISSIONING

Upon delivery, the CF500 battery is disconnected.

To start up the device:

1. Complete mechanical installation of CF500.
2. Connect all sensors according to wiring instructions.
3. Plug the battery into one of the designated connectors.
4. Synchronize the internal clock if needed.

Once connected, the system powers up and begins normal operation, displaying measurements and calculated values.

6.7 CALIBRATION

Attention: Calibration must be performed only by authorized laboratories.

To change protected parameters, follow this process:

1. Open CF500's casing.
2. Remove the metrological seal on the CPU cover.
3. Lift the metrological cover to activate the calibration switch.
4. Run the calibration procedure.
5. Replace the cover (switch deactivates) and reseal.
6. Close the CF500 housing.

Calibration ensures precise alignment of the input channels for temperature and pressure and must comply with regulatory standards. It's generally recommended every two years or prior to regulatory inspection.

7 СЪОТВЕТСТВИЕ С РЪКОВОДСТВО WELMEC 7.2

CF500 complies with Directive 2014/32/EU (MID) and the harmonized standard EN 12405-1. Additionally, its internal firmware meets the requirements of WELMEC Guide 7.2, which outlines conformity modules for measuring devices.

Supported WELMEC Modules:

Module	Description
P	Embedded software
I	Gas corrector-specific requirements
L	Long-term data storage

7.1 FIRMWARE TASKS

CF500's firmware manages::

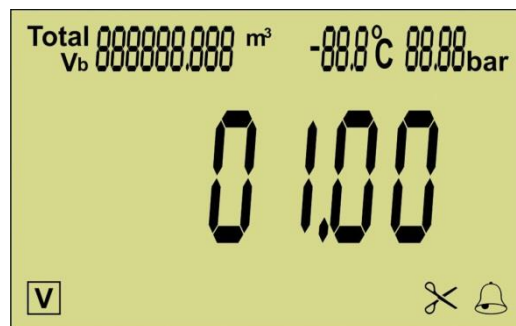
- Metrological functions
- Protection of metrological parameters
- Integrity and control of measurement data
- Archiving and duplication of critical data
- Verification of core system, parameters, and data consistency
- Display of metrological readings and configuration settings

Firmware identification

Firmware version information is displayed in a menu *InFolt* is entered from normal operation mode by pressing a button ►.

By pressing buttons ▼ and ▲ submenus are selected:

- *VERsION* – display software version;
- *CrC* – display of the software checksum;
- *S number* – display the device serial number.



DISPLAY SOFTWARE VERSION

7.2 FIRMWARE PROTECTION & DATA INTEGRITY

CF500 employs multiple layers of security to safeguard its firmware and critical measurement data, ensuring accuracy and legal compliance.

Firmware Verification

A CRC-16 checksum of the firmware is stored in non-volatile memory by the manufacturer.

Upon device startup, this checksum is validated.

If an inconsistency is found:

- Warning icons appear on the display.
- The event is logged in the alarm archive.

The firmware checksum (CRC-16) is written by the manufacturer in non-volatile memory and is checked when the CF500 is turned on. If the checksum is not correct, the icon lights up  and icon flashes . The event is logged in the alarm archive.

Configuration & Calibration Protection

Config & calibration data are stored in non-volatile memory.

Secured using flags and CRC-32 checksums.

Each time these settings are modified, new checksums are calculated.

On startup, the system checks both the flags and checksums:

- If invalid, defaults are used, icons flash, and the alarm is recorded
- In the CF500, configuration and calibration are stored in non-volatile memory, protected by flags and checksums (CRC-32).

These amounts are recalculated when the configuration and calibration are changed, respectively.

When turned on, the flags and checksums of these areas are checked. If the flag or checksum is not correct, the icon lights up  and icon flashes . The event is logged in the alarm log. The device starts operating with default values.

Gas Composition Parameters

Each section uses flags and CRC-32 protection.

✓ On power-up:

- RAM sections are checked first.
- If both are invalid, the non-volatile area is verified.
- If all fail, defaults are used, and an alarm is logged.

In the CF500, gas composition parameters are stored in two redundant areas in RAM and a third in non-volatile memory, protected by flags and checksums (CRC-32).

They are written to the non-volatile memory when the device configuration is written. They are written to the redundant RAM areas when the parameters are written in operating mode.

Checksums are recalculated when writing to the corresponding area.

When turned on, the flags and checksums of the areas in RAM are checked and if any of these areas are correct, the parameters from it are worked on. If both are incorrect, the icon lights up  and icon flashes . The event is registered in the alarm archive and the area saved in the non-volatile memory is checked. If it is correct, it is worked with, and if not, the device starts working with default values.

Totalizer Data Protection

Stored in:

- Two RAM areas
- One non-volatile memory section

Key protections:

- CRC-32 checksums recalculated after each measurement.
- Non-volatile memory updated daily at the start of each shift.
- Upon startup, RAM areas are checked first; fallback logic applies if necessary.

In CF500 totalizers are stored in two duplicate areas in RAM and in a third in non-volatile memory, protected by flags and checksums (CRC-32). The RAM areas also store the archive indexes. They are written to the non-volatile memory once a day (start of shift). The checksum of the totalizers is recalculated with each measurement.

When turned on, the flags and checksums of the areas in RAM are checked and if any of these areas are correct, it is worked on. If both are incorrect, the icon lights up  and icon flashes . The event is logged in the alarm log and the area stored in the non-volatile memory is checked. If it is correct, the device continues to operate with the data stored in it.

Archive Protection

- Archives reside in RAM, protected via CRC-16 checksums.
- Archive indices are part of the totalizer data block.
- On startup, invalid archives result in archive and totalizer reset.
- Event logged in the alarm archive and icons displayed.

In CF500 archives are stored in RAM, protected by checksums (CRC-16). The indexes of filling of archives are stored in the area with totalizers. The checksums of archives are calculated when filling the corresponding archive.

When turned on, the checksums of the archives are checked and if they are not correct, the archives and totalizers are reset, the icon lights up  and icon flashes . The event is logged in the alarm archive.

LCD Display Test

In test mode, the entire display can be illuminated to check for missing segments.

7.3 DATA ACCESS

CF500 offers multiple layers of access to device data and configuration, ensuring secure interaction through physical buttons and communication channels.

7.3.1 Access via Functional Buttons

Located inside the CF500 casing, these buttons become accessible only after breaking the customer seal.

Access levels:

Function	Access Protection
Configuration	Password protected
Gas composition editing	Password protected
Calibration	Requires password, calibration switch, and broken metrological seal
Archives	Read access without password; reset requires password
Totalizers	Read-only access; no write capability

All events related to data access are logged in the event archive.

Hardware Protection Mechanisms:

System Switch

- Activated when metrological cover is removed
- Grants access to calibration mode
- Actions are logged
- Protected via metrological seal

Customer Switch

- Triggered when device lid is opened
- Grants access to hidden buttons for configuration
- Protected via customer seal
- Logged in event archive

Software-Level Access

- All special modes are **password protected**, issued only to authorized personnel
- Some special modes (e.g. calibration) require **system switch activation**
- All unauthorized access attempts or configuration changes **are recorded as events**

7.3.2 Access via Communication Channels

CF500 communicates using Modbus RTU protocol, via:

- RS485
- GSM (with proprietary Unisyst data protocol layered over Modbus)

Security Measures:

- CRC-16 checksums are calculated for every packet (initial vector: 0xFFFF)

On receipt, the system verifies:

- CRC checksum
- Device address
- Command code
- Register address & count
- Byte counts
- Validity of values

If any check fails:

- Packet is rejected silently or with error code response
- Invalid or unrecognized commands have no effect on metrological software or data

8 DATA DESCRIPTION

8.1 TOTALIZERS

CF500 stores totalizer data in:

- Two redundant RAM sections
- One non-volatile memory section, protected by flags and checksums
- Non-volatile memory is updated once per day at the start of each shift. RAM sections also store residual fractions of totalizers (not recorded in Flash).

Upon startup:

- CF500 checks each RAM section. If one is valid, it proceeds with it.
- If both fail, the system verifies the non-volatile memory.
- If all fail, totalizers and archives are reset, and the issue is logged.

Display Format:

- If totalizer < 1,000,000 → shows up to three decimal places
- Otherwise → displays as an integer

•

Totalizer	Format
Uncorrected Volume	Integer < 1 000 000 000
Corrected Volume	Integer < 1 000 000 000
Energy	Integer < 1 000 000 000
Overall Corrected Volume	Integer < 1 000 000 000
Overall Energy	Integer < 1 000 000 000
Alarm Uncorrected Volume	Integer < 1 000 000 000
Alarm Corrected Volume	Integer < 1 000 000 000
Alarm Energy	Integer < 1 000 000 000
Residuals (Fractional Portions)	Float < 1.0

8.2 ARCHIVES

All archives are stored in RAM, protected with checksums. Archive indices reside alongside totalizers.

On startup:

- Archive integrity is verified
- If invalid, archives and totalizers are cleared
- Events are recorded in the alarm archive
- Archives can be manually reset, also logged as alarms.

8.2.1 PERIODIC ARCHIVES (Hourly, Daily, Monthly)

CF500 supports three cyclic archive types:

Archive Type	Entries Frequency
• Hourly - up to 400	per hour
• Daily - up to 400	per day
• Monthly - up to 132	per month

When full, new entries overwrite oldest ones.

Time periods start based on the configured shift start hour (e.g. 8:00 AM).

Each archive entry contains:

- Start time of period
- Integrated uncorrected / corrected / energy flow
- Overall totals for corrected volume and energy
- Alarm-mode integrated flows
- End-of-period totalizers
- Average temperature and pressure
- Device status code (bitwise)

8.2.2 ALARM ARCHIVE

Stores up to 300 entries related to autonomous device operation.

Each entry includes:

- Alarm timestamp
- Alarm code (indicates type and status: active or cleared)

8.2.3 EVENT ARCHIVE

Stores up to 300 entries related to system changes or interactions.

Each entry includes:

- Event timestamp
- Event code (e.g. config changes, access, battery status)
- Display methods for alarms and events are covered in Section 9.3.2.1.

8.3 CONFIGURATION PARAMETERS

Configuration data is stored in non-volatile memory, protected by flags and CRC checksums. These checksums are recalculated whenever new configurations are saved.

On startup:

- The system checks flag and checksum integrity.
- If errors are found, default configuration values are loaded.
- The event is recorded in the alarm archive.
- Parameters can be viewed and edited in Configuration Mode, described further in Section 9.3.3.2.

8.4 GAS PARAMETERS

Gas composition data is saved in:

- Two redundant RAM areas
- One non-volatile memory block
- Each area is protected by flags and CRC-32 checksums.

Data entry workflow:

- During configuration: values are stored in flash
- During editing mode: values are stored in RAM
- Checksums are recalculated whenever values are updated

On startup:

- If one RAM section is valid, it's used.
- If both fail, flash memory is checked.
- If all checks fail, default gas parameters are loaded.
- Visual warning icons are displayed, and an alarm event is logged.
- Parameters can be viewed and adjusted via Gas Parameters Mode, detailed in Section 9.3.3.1.

9 USER INTERFACE

The CF500 features a specialized LCD display, a keyboard with five functional buttons, and two light-sensitive sensors. By default, the display remains off to conserve battery life and activates when:

A button is pressed

One of the light sensors is triggered (requires adequate ambient light)

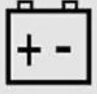
Display Overview



The LCD screen is organized into multiple fields:

	Displays totalizers for uncorrected, corrected, and energy volumes, along with status icons
	Shows measured temperature (°C); displays “Err” if sensor alarm is active
	Shows measured pressure (bar); displays “Err” if sensor alarm is active
	Indicates current special modes (e.g., CONFIG, COMPOSITION, CALIBRATION)
	Shows real-time values (flows, correction factors, timestamps)
	Displays units of current values (m³, kWh, °C, etc.)
	Indicates labels or symbols for displayed values
	Two rows showing system status, alarms, battery warnings, and operation indicators

The CF500 displays the following icons to indicate different statuses:

	Device version icon: • on – the software version and checksum are indicated in the “values” field; • off – for all other displays.
	calendar icon: • on – the date is displayed in the “values” field; • off – for all other readings.
	clock icon: • on – time is displayed in the “values” field; • off – for all other displays.
	GSM icon: • on – when there is communication via GSM; • off – in all other cases.
	archive icon: • on – when archives are displayed; • off – in all other cases.
	external power icon: • on – when the CF500 is powered by an external power source; • off – when there is no external power source or no power.
	warning icon: • flashing – when there is any alarm; • off – in all other cases.
	battery icon: • on – after 90% of battery capacity has been depleted • off – battery voltage is normal.
	boundary icon: • on – when there is a sensor alarm; • off – in all other cases.
	alarm icon: • on – when there is a technological alarm; • off – in all other cases.
	alarm totals icon: • on – when alarm totals or periodic integrated costs are displayed; • off – in all other cases.
Total	icon for grand totals: • on – when grand totals or periodic integrated costs are displayed; • off – in all other cases.

9.1 FORMAT OF ELECTRONIC COUNTERS

CF500 displays uncorrected, corrected, and energy totalizers using up to 9 significant digits:

- Values < 1 000 000 show three decimal places
- Larger values appear as full integers

To comply with MID standards:

- “Display must have enough digits to support counter growth for 8000 hours at max flow without resetting.”

That translates to:

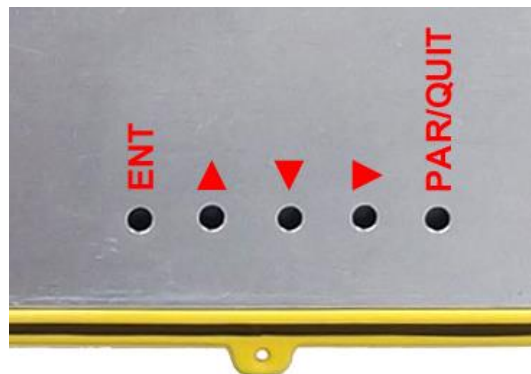
- Max uncorrected/corrected flow: < 125000 m³/h
- Max energy flow: < 125000 kW

9.2 FUNCTIONAL BUTTONS

The CF500 is equipped with 5 function buttons. They are located inside the housing. Access to them is possible after opening the housing, that is, after breaking the customer seals. Opening the housing is registered in the event archive.

Located inside the casing:

Button	Purpose
PAR/QUIT	Enter special modes / cancel / back
▶	Access work modes / toggle archive timestamps
▼ / ▲	Navigate menus / change values
ENT	Confirm selections and edits



function button layout

During numeric editing:

- ▶: Selects digit (blinks)
- ▼ / ▲: Changes value
- **QUIT**: Cancels edit, restores original
- **ENT**: Saves edited value

9.3 OPERATING MODES

On startup, CF500 enters Normal Operation Mode.

Navigation:

- ▶ - Access Work Modes (unrestricted)
- PAR/QUIT** - Enter Special Modes (restricted).

9.3.1 NORMAL OPERATION

Includes:

- Real-time measurement of inputs
- Display of flows, correction factor, timestamps
- Archiving totals and periodic summaries
- Monitoring of alarms and events



display in "normal operation" mode

Totals & values auto-cycle or toggle via:

- Button press
- Light sensor activation
- Configurable time interval

Totals shown:

the display shows				explanation
icon	ident.	totalizer	unit	
	V	127562.523	m³	totalizer unadjusted volume
	Vb	954761.333	m³	totalizer adjusted volume
	W	4127567	kW	totalizer energy
Total	Vb	955715.663	m3	total totalizer adjusted volume
Total	W	4132894	kW	total energy totalizer
↕↕	V	127.52	m³	alarm totalizer for unadjusted volume
↕↕	Vb	954.330	m³	alarm totalizer for adjusted volume
↕↕	W	5327.567	kW	energy totalizer alarm

The dimension of the energy totalizer is determined when configuring the device (kWh or GJ).

Totalizers can be changed automatically after a certain time, when pressing the ▲ button and when the left photosensitive sensor is shaded. The time for automatic change of totalizers is determined when configuring the device. The first three totalizers from the above table are displayed unconditionally, and which of the total and alarm totalizers to display is determined when configuring the device.

Temperature display:

The "temperature" field displays the measured temperature value (3 digits with 1 digit after the decimal point) and the temperature dimension (°C). If a temperature sensor alarm has occurred, the *Err* is displayed instead of the three digits, the icon  is lit and the icon  is flashing.

Pressure display:

The "pressure" field displays the measured pressure value (4 digits with 2 digits after the decimal point) and the pressure dimension (bar).

If a pressure sensor alarm has occurred, the message *Err* is displayed instead of the four digits, the icon  is lit and the icon  flashes.

Show current costs and other metrics:

The "quantities" field (7 digits) displays the values of various quantities, the "identifier" or "icons" field indicates which quantity is currently displayed, and the "dimension" field displays the dimension of the quantity, if any. For example:

the display shows				explanation
icon	ident.	totalizer	unit	
		01.06.15		date
		12:30:54		time
	C	7.358		correction factor
	Q	127.52	m³/h	current unadjusted cost
	Qb	954.33	m³/h	current adjusted cost
	P	4127.54	kWh	instantaneous energy consumption
	Z	0.99345		shrinkage coefficient under operating conditions
	Zb	0.99345		shrinkage coefficient at base conditions
		01.00		software version

The dimension of energy consumption is determined when configuring the device (kW or GJ/h).

The values can be changed automatically during a certain time, when pressing the ▼ button and when the right light sensor is shaded. The time for automatic change of values is determined when configuring the device. The date, time, current corrected flow rate and software version are displayed unconditionally, and which of the other values to display is determined when configuring the device.

The total corrected totalizer can be displayed permanently in the “quantities” field. This happens if the time for automatic change of quantities is equal to 1. When pressing the ▼ button, the display switches to the display of the remaining quantities. When the right light-sensitive sensor is shaded, the totalizer is displayed again. If it is greater than 9999999, **XXXXXXXX** is displayed in the field.

9.3.2 WORK MODES (Unrestricted Access)

The operating modes menu is entered from the “normal operation” mode by pressing the ► button. In these modes, the main operation of the device continues – measuring input values, calculating instantaneous costs, accumulating totalizers and periodic archives, monitoring for alarms and events and archiving them. In some of the display fields, information is displayed that is different from that in the “normal operation” mode. The operating modes (with unlimited access) are:

- *EVENTS* – View active alarms & events;
- *Int FL* – Totals and periodic archive stats;
- *InFo* – Device metadata: firmware version, serial no.

Each contains submenus navigated via ▲/▼, confirmed with **ENT**, exited with **PAR/QUIT**.

9.3.2.1 Displaying alarms and events

The submenus of this mode are:

- *ACTIVE* – display current alarms;
- *teCH* – display of alarm and event archive;
- *SPECIAL* – display event archive.

Use the ▼ and ▲ buttons to select a submenu.

Use the **ENT** button to enter the submenu.

Use the **QUIT** button to return to the operating modes menu.

The alarm codes are:

- *ConF* – configuration error;
- *ConF P* – error in configuration parameters;
- *CAL* – calibration error;
- *rom* – software checksum error;
- *rAm* – archive error;
- *PAr G* – gas parameter error;
- *CALC* – cost calculation error;
- *H rSt* – hard reset;
- *s rSt* – software reset;
- *bAtLow* – low battery voltage (warning);
- *bAtbAd* – critically low battery voltage;
- *bAtGSM* – low GSM battery voltage;
- *HS t* – upper sensor alarm on temperature input;
- *LS t* – low sensor alarm on temperature input;
- *HS P* – upper pressure input sensor alarm;
- *LS P* – low pressure input sensor alarm;
- *Adc t* – Temperature ADC not working;
- *Adc P* – Pressure ADC not working;
- *Pow t* – failure in the power supply of the ADC for temperature and pressure;
- *Pow P* – pressure sensor power supply failure.

The event codes are:

- *old time* – old time when setting the clock;
- *nEw time* – new time when setting the clock.
- *SEt CnF* – new configuration saved;
- *SEt CAL* – a new calibration has been saved;
- *SEt PAR* – new gas composition parameters have been recorded;
- *CLr Arch* – archives reset;
- *OPEn door* – the device lid is open;
- *CLOS door* – the device lid is closed;
- *EnAbL CAL* – access to calibration and tests is allowed;
- *dISbL CAL* – access to calibration and tests is prohibited.

Show current alarms:

The “values” field displays the code of the currently existing alarm.

If there are no alarms, the message „*nonE*” is displayed.

Use the ▼ and ▲ buttons to browse the list of existing alarms.

Use the **PAR/QUIT** button to return to the alarm and event display menu.

Show archived alarms:

The date  of the archived alarm is displayed in the “values” field.

The “totals” field displays the alarm code and „*Err*” if the alarm has occurred or „*not*” if it has failed.

If there are no archived alarms and when the beginning or end of the archive is reached, the message „*nonE*” is displayed.

The ► button changes the display in the “values” field – date  and time .

The ▼ and ▲ buttons are used to view the list of archived alarms.

The **PAR/QUIT** button returns to the alarm and event display menu.

Show archived events:

The date  of the archived event is displayed in the “values” field.

The event code is displayed in the totals field.

If there are no archived events and when the beginning or end of the archive is reached, the message „*nonE*” is displayed.

The ► button changes the display in the “values” field – date  and time .

The ▼ and ▲ buttons are used to view the list of archived events.

The **PAR/QUIT** button returns to the alarm and event display menu.

9.3.2.2 Displaying totalizers and periodic archives

The submenus of this mode are:

- *totALS* – totalizers;
- *currnt h* – integrated costs for an incomplete (current) hour;
- *currnt d* – integrated costs for the completed (current) day;
- *currnt m* – integrated costs for an incomplete (current) month;
- *Arch h* – hourly archives;
- *Arch d* – daily archives;
- *Arch m* – monthly archives.

Use the ▼ and ▲ buttons to select a submenu.

Use the **ENT** button to enter the submenu.

Use the **PAR/QUIT** button to return to the operating modes menu.

Show totalizers:

The totals that are displayed in this mode are:

the display shows				explanation
icon	ident.	totalizer	unit	
	V	2345683	m ³	unadjusted totalizer
	Vb	9345678	m ³	adjusted totalizer
	W	12256783	kWh	energy totalizer (with the dimension selected during configuration)
Total	Vb	4356.783	m ³	total adjusted totalizer
Total	W	234567	kWh	total energy totalizer (with the dimension selected during configuration)
↓↑	V	234.683	m ³	alarm uncorrected totalizer
↓↑	Vb	934.678	m ³	alarm adjusted totalizer
↓↑	W	1225.783	kWh	alarm energy totalizer (with the dimension selected during configuration)

The **ENT** button changes the listed totalizers.

The **PAR/QUIT** button returns to the totalizer and periodic archive display menu.

Show integrated costs for an incomplete period:

The "totals" field displays the integrated unadjusted cost for the relevant period (hour, day, month). The integrated costs that are displayed in this mode are:

the display shows				explanation
icon	ident.	totalizer	unit	
	V	283.234	m ³	integrated unadjusted cost for an incomplete period
	Vb	934.678	m ³	integrated adjusted cost for an incomplete period
	W	1225.783	kWh	integrated energy consumption for an incomplete period (with the dimension selected during configuration)
Total	Vb	1028.356	m ³	total integrated adjusted cost for an incomplete period
Total	W	1348.566	kWh	total integrated energy consumption for an incomplete period (with the dimension selected during configuration)
↓↑	V	23.683	m ³	alarm integrated unadjusted expense for an incomplete period
↓↑	Vb	93.678	m ³	alarm integrated adjusted cost for an incomplete period

	W	122.783	kWh	alarm integrated energy consumption for an incomplete period (with the dimension selected during configuration)
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The **ENT** button changes the listed integrated costs.

The **PAR/QUIT** button returns to the totalizers and periodic archive display menu.

Show archive with integrated costs for a completed period:

The "quantities" field displays the start date  of the selected period.

The "temperature" field displays the average temperature for the selected period.

The "pressure" field displays the average pressure for the selected period.

The "totals" field displays the integrated costs for the corresponding completed period (hour, day, month). The integrated costs that are indicated in this mode are:

the display shows				explanation
icon	ident.	totalizer	unit	
	V	283.234	m³	integrated unadjusted cost for the completed period
	Vb	934.678	m³	integrated adjusted cost for the completed period
	W	1225.783	kWh	integrated energy consumption for the completed period (with the dimension selected during configuration)
Total	Vb	1028.356	m³	total integrated adjusted cost for the completed period
Total	W	1348.566	kWh	total integrated energy consumption for the completed period (with the dimension selected during configuration)
	V	23.683	m³	alarm integrated unadjusted cost for completed period
	Vb	93.678	m³	alarm integrated adjusted cost for completed period
	W	122.783	kWh	alarm integrated energy consumption for the completed period (with the dimension selected during configuration)

If there are no archived integrated costs for the selected period and when the beginning or end of the archive is reached, the message „*nonE*“ is displayed.

Press the **ENT** button to change the listed integrated costs.

Press the ► button to change the displayed value in the “values” field – date  and time .

Press the ▼ and ▲ buttons to view the archived integrated costs for the previous and next period.

Press the **PAR/QUIT** button to return to the menu for displaying totalizers and periodic archives.

9.3.2.3 Displaying device information

The submenus of this mode are:

- *VERsION* – display software version;
- *Crc* – display software checksum;
- *S number* – display the device serial number.

Use the ▼ and ▲ buttons to select a submenu, and the **ENT** button to enter the submenu. Use the **PAR/QUIT** button to return to the operating modes menu.

Show software version:

The icons field displays **V**, and the software version is displayed in the "sizes" field:

V 01.00

Press the **PAR/QUIT** button to return to the device information display menu.

Show software checksum:

The icons field displays **V**, and the "quantities" field displays the software checksum as a decimal number:

V 62023

Press the **PAR/QUIT** button to return to the device information display menu.

Show device serial number:

In the "identifiers" field, **Sn** is displayed, and in the "values" field, the device's serial number is displayed:

Sn 0003001

Press the **PAR/QUIT** button to return to the device information display menu.

9.3.3 SPECIAL MODES (Restricted Access)

The special modes menu is entered from the "normal operation" mode by pressing the **PAR/QUIT** button.

The changes made in these modes affect the operation of the device. Therefore, these modes have limited access - each of them is entered after entering a different password, which is known only to authorized personnel for this activity. Entering the special "Calibration" mode is also protected with a hardware key.

In the special modes, information is displayed in some of the display fields that is different from that in the "normal operation" mode. In some of the special modes, parameters can be edited. Editing is performed in the "values" field in the following way, depending on the parameter:

Editing of integer:

Press the ► button and the first digit of the number starts flashing. With this button, all digits of the number can be selected sequentially and cyclically. The selected digit flashes and can be increased and decreased cyclically with the ▲ and ▼ buttons. When the **ENT** button is pressed, the newly entered value is checked to see if it is within certain limits and if not, it is limited. When the **PAR/QUIT** button is pressed, the editing is terminated and the old value of the parameter is restored.

Editing a number with a fractional part:

Press the ► button and the first digit of the number starts flashing. With this button, all digits of the number and the decimal point can be selected sequentially and cyclically. The selected position flashes. If a digit is selected, it can be increased and decreased cyclically with the ▲ and ▼ buttons. If the point is selected, it can be moved left and right cyclically with the ▲ and ▼ buttons. When the **ENT** button is pressed, the newly entered value is checked to see if it is within certain limits and if not, it is limited. When the **PAR/QUIT** button is pressed, the editing is terminated and the old value of the parameter is restored.

Menu selection:

Press the ► button and the message starts flashing. Use the ▲ and ▼ buttons to scroll through the message menu. Press the **ENT** button to save the newly selected item. Press the **PAR/QUIT** button to cancel the editing and restore the old menu item.

The special modes (with limited access) are:

- *PAR GAS* – editing gas parameters;
- *ConFIG* – device configuration;
- *CLOCK* – setting the clock;
- *Clr Arh* – reset archives;
- *CAL Ibr* – input channel calibration;
- *tEst* – test mode.

Use the ▼ and ▲ buttons to select a menu item, and the **ENT** button to confirm the selection.

The message „*PASS*” appears in the “values” field. When the **ENT** button is pressed, *0000000* appears in the “values” field. A password must be entered and if it is correct, the corresponding special mode is entered. The **PAR/QUIT** button returns to the “normal operation” mode.

9.3.3.1 Редакция на параметрите на газа

COMPOSITION is highlighted in the "modes" field.

The parameters that are edited in this mode, as well as the methodology in which they are used, are described in the table:

Parameter	ident.	description	unit	Methodology			Kz
				AGANX19	SGERG	AGA08	
<i>hs</i>	H_s	calorific value of gas	MJ/m3	x	x	x	x
<i>ron</i>	Rho	base density	kg/m3	x	x		
<i>CH4</i>		methane	%			x	
<i>n2</i>	N₂	nitrogen	%	x		x	
<i>CO2</i>	CO₂	carbon dioxide	%	x	x	x	
<i>C2H6</i>		ethane	%			x	
<i>C3H8</i>		propane	%			x	
<i>H2O</i>		water	%			x	
<i>HS</i>		hydrogen sulfide	%			x	
<i>H2</i>		hydrogen	%		x	x	
<i>CO</i>		carbon monoxide	%			x	
<i>O2</i>		oxygen	%			x	
<i>C4H10</i>		isobutane	%			x	
<i>c4h10</i>		butane	%			x	
<i>C5H12</i>		isopentane	%			x	
<i>c5h12</i>		pentane	%			x	
<i>C6H14</i>		hexane	%			x	
<i>C7H16</i>		heptane	%			x	
<i>C8H18</i>		octane	%			x	
<i>C9H20</i>		nonan	%			x	
<i>C10H22</i>		decan	%			x	
<i>HE</i>		helium	%			x	
<i>Ar</i>		argon	%			x	
<i>Kz</i>		shrinkage correction factor					x
<i>Store</i>		Saving parameters		x	x	x	x

The parameter description is displayed in the “value” field. Use the ▼ and ▲ buttons to select a parameter from the menu, and use the **ENT** button to confirm and proceed to editing the selected parameter. The parameter value is displayed in the “value” field, and the dimension in the “dimension” field. For some of the parameters, an identifier is also displayed in the “identifiers” field. Use the **PAR/QUIT** button to return to the special modes menu.

In gas parameter editing mode, the device continues to perform all calculations, integrate costs, archive integrated costs, and work with the old parameter values.

When *Store* is selected – save parameters – the message „*SurE*” is displayed. If you cancel with the **PAR/QUIT** button, you return to the parameter editing menu. When you confirm with the **ENT** button, the checksum of the parameter area is calculated and the duplicate RAM areas are filled. The device starts working with the new parameters.

In this mode, the parameters are remembered, but not written to the non-volatile memory. They are written to the flash memory when the configuration is saved.

9.3.3.2 Device configuration

CONFIG is lit in the “modes” field. Some of the configuration parameters cannot be edited, but are only displayed (marked with). Others can be edited only if the “calibration” switch is on (marked with).

The parameters and their dimensions and ranges are described in the following table:

Parameter	Description	Unit	Possible values
<i>S number</i>	serial number		1 ÷ 9999999
<i>OFF Ind</i>	indicator off time after the last button press	s	20 ÷ 250
<i>ChG UAr</i>	time to change values 0 – do not change automatically	s	0 ÷ 10
<i>ind C</i>	indication of the correction factor		- <i>not</i> – not indicated - <i>YES</i> – is indicated
<i>ind q</i>	indication of the current uncorrected consumption		- <i>not</i> – not indicated - <i>YES</i> – is indicated
<i>ind P</i>	indication of current energy consumption		- <i>not</i> – not indicated - <i>YES</i> – is indicated
<i>ind z</i>	indication of the shrinkage coefficient		- <i>not</i> – not indicated - <i>YES</i> – is indicated
<i>ind zb</i>	indication of the basic shrinkage coefficient		- <i>not</i> – not indicated - <i>YES</i> – is indicated

<i>ChG tot</i>	time to change totalizers 0 – do not change automatically	s	0 ÷ 10
<i>ind tVb</i>	indication of the total adjusted totalizer		- <i>not</i> – not indicated - <i>YES</i> – is indicated
<i>ind tW</i>	indication of the total energy totalizer		- <i>not</i> – not indicated - <i>YES</i> – is indicated
<i>ind SV</i>	indication of the alarm uncorrected totalizer		- <i>not</i> – not indicated - <i>YES</i> – is indicated
<i>ind SVb</i>	indication of the alarm corrected totalizer		- <i>not</i> – not indicated - <i>YES</i> – is indicated
<i>ind SW</i>	indicating the alarm energy totalizer		- <i>not</i> – not indicated - <i>YES</i> – is indicated
<i>CALC kz</i>	methodology for calculating the correction coefficient of compressibility		- <i>AGA19</i> – AGANX19 mod; - <i>SGErG</i> – SGERG 88; - <i>AGA08</i> – AGA8-92DC; - <i>ConSt</i> – Kz is a constant.
<i>dim E</i>	energy dimension		- <i>KWh</i> – kWh; - <i>GJ</i> – GJ;
<i>P mEAS</i>	pressure measurement		- <i>ConSt</i> – the pressure is constant; - <i>AdC</i> – pressure is measured on an analog input; - <i>SERIAL</i> – the value is received via the serial interface.
<i>P Lr</i>	lower limit of the pressure conversion range	bar	0.0 ÷ 50.0
<i>P Hr</i>	upper limit of the pressure conversion range	bar	0.001 ÷ 100.0
<i>P nom</i>	nominal pressure value	bar	0.0 ÷ 100.0
<i>t nom</i>	nominal temperature value	°C	-20.0 ÷ 50.0
<i>Ct</i>	turbine constant	m ³ /pulse	0.001 ÷ 100.0
<i>t PULS</i>	time to reset the instantaneous flow rate after the last pulse	s	10 ÷ 250

<i>t StArt</i>	measurement period with display off and external power supply	s	5 ÷ 250
PA	atmospheric pressure	bar	0.0 ÷ 0.0
<i>Pb</i>	base pressure	bar	0.1 ÷ 2.0
<i>tb</i>	base temperature	°C	0.0 ÷ 20.0
<i>robA</i>	base air density	kg/m ³	0.5 ÷ 2.0
<i>bEG Sh</i>	start of shift		0 ÷ 11
<i>rS comm</i>	serial communication		- <i>not</i> – no communication; - <i>rS485</i> – RS485; - <i>GSm</i> – GSM.
<i>rS num</i>	communication number		0 ÷ 255
<i>rS SPd</i>	communication speed	baud	- 1200; - 2400; - 4800; - 9600; - 19200; - 38400.
<i>rS tYPE</i>	type of communication		- <i>not 1</i> – without control, 1 stop bit; - <i>not 2</i> – without control, 2 stop bit; - <i>EVEn 1</i> – parity check, 1 stop bit; - <i>EVEn 2</i> – parity check, 2 stop bit; - <i>Odd 1</i> – oddness control, 1 stop bit; - <i>Odd 2</i> – oddness control, 2 stop bit.
<i>StorE</i>	recording parameters		

The parameter description is displayed in the “size” field. Use the ▼ and ▲ buttons to select a parameter from the menu, and the **ENT** button to confirm and proceed to editing the selected parameter. The parameter value is displayed in the “size” field. For some of the parameters, the dimension is displayed in the “dimension” field and the identifier in the “identifiers” field. Use the **PAR/QUIT** button to return to the special modes menu. При потвърждаване на нововъведената стойност на параметъра, тя се проверява дали е в определени граници и се ограничава, ако не е.

In configuration mode, the device continues to perform all calculations, cost integration, archiving of integrated costs, working with the old values of the configuration parameters. When *Store* is selected – saving configuration – the message „*Sure*” is displayed. If canceled with the **PAR/QUIT** button, the configuration menu is returned. When confirmed with the **ENT** button, the checksum is calculated and the configuration area is saved in the non-volatile memory. The gas composition parameters are also saved in the non-volatile memory. The device restarts and starts working with the new configuration parameters.

9.3.3.3 Clock adjustment

The submenus of this mode are:

- *date* – date revision;
- *time* – time edit;
- *Set* – recording the new time and date in the clock.

Use the ▼ and ▲ buttons to select a menu item.

Use the **ENT** button to confirm.

When editing the date or time, they are remembered, but not saved in the clock. When selecting *Set*, the message „*Sure*” is displayed. If you cancel with the **PAR/QUIT** button, you return to the clock adjustment menu. When you confirm with the **ENT** button, the date and time are simultaneously saved in the clock.

9.3.3.4 Resetting archives

When entering this mode with the **ENT** button, the message „*Sure*” is displayed. With the **PAR/QUIT** button, the archive reset can be canceled and the special modes menu is entered. If the reset is confirmed with the **ENT** button, the RAM area with the archives is reset.

9.3.3.5 Input Channel Calibration

Entering this mode is possible only after removing the metrological seal and turning on the “calibration” switch.

When entering this mode with the **ENT** button, **CALIBRATION** lights up in the “modes” field.

It is recommended that the calibration of the device be performed only by the manufacturer or persons authorized by him. After calibration, it is mandatory that the device pass a state inspection. Calibration is recommended every two years or before each state inspection.

The menu in this mode is:

- *t L* – temperature low point calibration (-20 °C);
- *t m* – temperature midpoint calibration (15 °C);
- *t H* – upper temperature point calibration (50 °C);
- *P L* – pressure bottom point calibration;

- *P m* – pressure midpoint calibration;
- *P H* – upper pressure point calibration;
- *Store* – recording of calibration coefficients.

The values of the pressure calibration points are calculated depending on the range of the pressure sensor.

Use the ▼ and ▲ buttons to select an item from the menu, and the **ENT** button to confirm the selection.

In the “quantities” field, the value that must be fed to the input of the corresponding sensor is displayed. Wait for the quantity to be established and press the **ENT** button.

In the “quantities” field, the code received from the ADC is displayed. After pressing the **ENT** button, the measured resistance is displayed (for temperature calibration) or the measured pressure scaled from 0 to 1 (for pressure calibration). After pressing the **ENT** button, the measured physical quantity is displayed. With the **PAR/QUIT** button, the calibration of the corresponding point is completed and the menu returns to the calibration mode.

In calibration mode, the device continues to perform all calculations, integration of costs, archiving of integrated costs. During calibration, the device works with the old values of the calibration

coefficients. When *Store* – save calibration – is selected, the message „*Sure*” is displayed. If you cancel with the **PAR/QUIT** button, you return to the calibration menu. When you confirm with the **ENT** button, the checksum is calculated and the calibration area is saved in the non-volatile memory. The device is restarted and starts working with the new calibration coefficients.

9.3.3.6 Test mode

This mode is only available to the manufacturer.

10 SAFETY INSTRUCTIONS

- CF500 is compliant with Directive 2014/34/EU (ATEX), which governs equipment used in explosive atmospheres.
- The “CE” marking on CF500 reflects conformity with:
 - ATEX Directive 2014/34/EU
 - Measuring Instruments Directive (MID) 2014/32/EU
 - Electromagnetic Compatibility Directive (EMC) 2014/30/EU

10.1 ATEX ZONE CLASSIFICATION

CF500 is certified as Category 2 equipment, suitable for use in Zone 1, meaning areas with periodic presence of explosive gases.

Official ATEX marking:  II 2 G Ex ib IIB T4 Gb

- II: Equipment group for gas environments
- 2: Category indicating Zone 1 usage

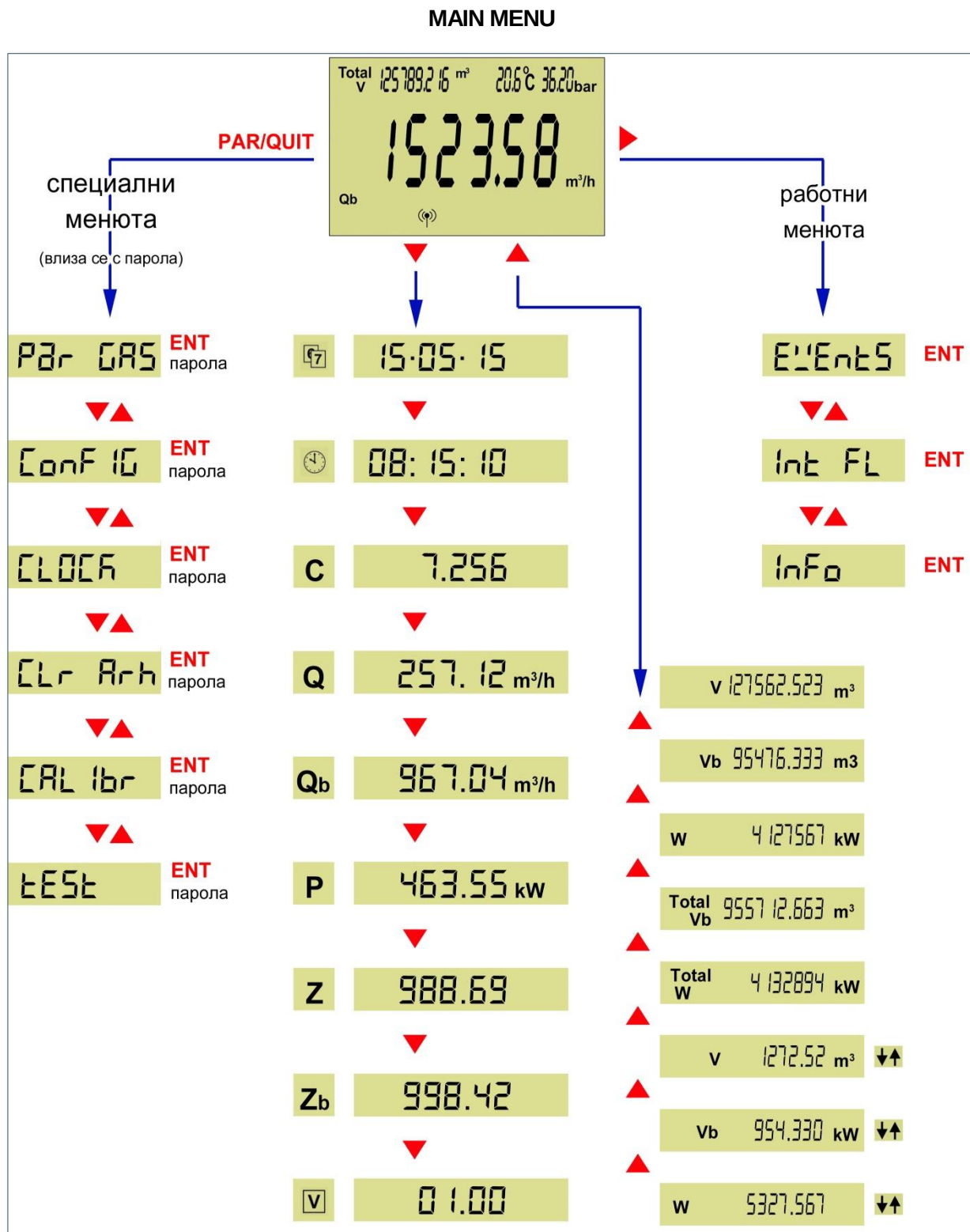
- G: Suitable for gas atmosphere
- Ex ib: Intrinsically safe protection type
- IIB: Gas subgroup
- T4: Temperature class
- • Gb: Equipment protection level

10.2 SPECIFIC INSTRUCTIONS

- To avoid incorrect operations, it is advisable to read the operating manual completely before commissioning.
- CF500 is suitable for use with gases belonging to "IIB" class:
 - !! Use with oxygen is strictly prohibited (oxygen is not covered by ATEX).
- The connection of the CF500 to any other instrument or appliance must be in accordance with the electrical parameters specified in the certificate.
- It should be noted that Directive 1999/92/EEC ("Installation/Consumers ") must also be observed when putting the device into operation..
- For external power supply of CF500, a fail-safe module CF500-POW must be used. The use of any other type of module is strictly prohibited. In this mode, the main battery remains connected inside the CF500 in case of external power failure..
- When the CF500 is used only with the optional internal battery CF500-GSMBAT, field replacement is allowed.
- When the CF500 is used with only the CF500-BAT internal battery, field replacement of the internal battery is allowed. Insert the new battery into the free battery connector and then remove the old battery.
 - !! It is strictly forbidden to leave the CF500 in the danger zone with two CF500-BAT batteries permanently connected.
- Warning:** The CF500 batteries incorporate all safety measures. Therefore, it is strictly forbidden to replace the batteries with any other type than those supplied by the manufacturer.
- Battery Warnings: The CF500 battery contains lithium:
 - Risk of ignition, explosion and severe burns;
 - !! Do not recharge, do not short circuit, do not crush, do not disassemble, do not expose to heat above 100 °C, do not expose the contents to water;
 - !! Do not solder directly to the battery;
 - Battery storage recommendations (-30 °C; +60 °C).
- Hand over used batteries for disposal to registered organizations for the recovery of unusable batteries and accumulators..
- To prevent any damage, the following operations are recommended to limit electrostatic discharge inside the CF500:
 - wipe only with a wet cleaning cloth;
 - the person performing the installation can discharge himself by touching a potential equalization busbar.

11 MENU DIAGRAMS

Below is a schematic of the sequence of menus displayed on the display by pressing the corresponding buttons (shown in red).



WORKING MENUS

EVENTS

ENT

ACTIVE	ENT QUIT	bAtt	
▼▲			
TECH	ENT QUIT	ran not t P 12.05.15	☰
▼▲			
SPECIAL	ENT QUIT	Enb SPEC 12.05.15	☰

При разглеждане на запис:

- ▶ сменя алтернативно date / time
- ▲ един запис напред
- ▼ един запис назад

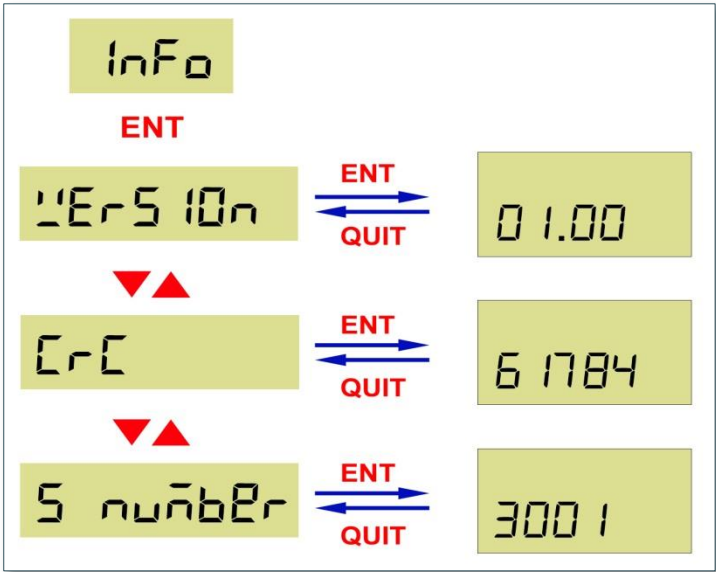
Int FL

ENT

totalS	ENT QUIT	Vb 84 16.329 m³	
▼▲			
current h	ENT QUIT	V 2836.236 m³	
▼▲			
current d	ENT QUIT	W 125.733 kWh	↕
▼▲			
current ñ	ENT QUIT	Vb 9476.333 m³	
▼▲			
Arch h	ENT QUIT	Vb 9476.333 m³ 20:58:35	☰ 🕒
▼▲			
Arch d	ENT QUIT	Vb 9476.333 m³ 12.05.15	☰ 📅
▼▲			
Arch ñ	ENT QUIT	Vb 9476.333 m³ 01.05.15	☰ 📅

При разглеждане на запис:

- ▶ сменя алтернативно date / time
- ▲ един запис напред
- ▼ един запис назад



SPECIAL MENUS

The special menus are described in the form of tables in section 9.3.3 Special modes (with limited access).

12 ATEX CERTIFICATE





“МИНПРОЕКТ” ЕАД

СЕРТИФИКАТ



ЗА СЪОТВЕТСТВИЕ
„МОДУЛ В: ЕС ИЗСЛЕДВАНЕ НА ТИПА”

[1] **НАРЕДБА** за съществени изисквания и оценяване на съответствието на съоръжения и системи за защита, предназначени за използване в потенциално експлозивна атмосфера (*Приета с ПМС № 47 от 15.03.2016 г., Обн., ДВ, бр. 23 от 25 март 2016 г.*), въвеждаща **ДИРЕКТИВА 2014/34/ЕС (ATEX)** от 26.02.2014 г.

[2] Сертификат по „Модул В: ЕС изследване на типа” №: **MP 20 ATEX 0169 X**

[3] Продукт: (съоръжение или защитна система): „**PTZ коригиращо устройство** за обем CF 500-XYZ”

[4] Заявител: „**Унисист инженеринг**” ЕООД

[5] Адрес: Р. България, гр. София 1582, ж.к. „Дружба”, бул. „Проф. Цветан Лазаров” № 144

[6] Производител: „**Унисист инженеринг**” ЕООД

[7] Адрес: Р. България, гр. София 1582, ж.к. „Дружба”, бул. „Проф. Цветан Лазаров” № 144

[8] Този продукт (съоръжение или система за защита), както и всяко едно от допустимите изменения, са отразени в подробности в приложението към този сертификат, както документите посочени в него.

[9] „Минпроект” ЕАД – Нотифициран орган с идентификационен № 1877 в съответствие с Чл. 17 на Директива на съвета 2014/34/ЕС (ATEX) от 26 февруари 2014 г., удостоверява, че това съоръжение или защитна система е в съответствие със съществени изисквания за здраве и безопасност по отношение на проектирането и конструкцията на съоръжения и системи за защита, предназначени за използване в потенциално експлозивни атмосфери, дадени в Приложение II на Директивата. Резултатите от изследванията и изпитванията са дадени в:

поверителен Протокол от изпитване № 15/07.08.2015 г.

[10] Съответствието със съществени изисквания са гарантирани чрез съответствието с:
БДС EN 60079-0:2018; БДС EN 60079-11:2012.

[11] Ако знакът „X” е поставен след номера на сертификата, то той показва, че това съоръжение или система за защита е обект на специални условия за безопасно използване, определени в приложението към този сертификат.

[12] Този сертификат за съответствие по „Модул В: ЕС изследване на типа” се отнася само за проектирането и конструкцията на определеното съоръжение или система за защита в съответствие с АТЕХ Директива 2014/34/ЕС.

Този сертификат не обхваща изискванията на Директивата по предстоящите процедури, касаещи производствения процес и доставката на продукта.

[13] Маркировката на съоръжението или системата за защита, трябва да включва следното:


II 2 G Ex ib IIB T4 Gb
-25°C ≤ T_a ≤ +55°C

Този Сертификат не дава право на Производителя или неговият упълномощен представител да поставят СЕ маркировка, следвана от идентификационния номер на Нотифицирания орган, както и пускането на пазара и/или в експлоатация. Този Сертификат се явява, като продължение на Сертификат MP 15 ATEX 0169 X. Сертификатът е валиден до 10.07.2025 г., ако няма промяна на условията, при които е издаден.

София, Дата: 10.07.2020 г.

Исп. Директор:
 /инж. Р. Биков/

Стр. 1 от 3




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www.minproekt.com

Направление “Научно-приложна дейност” - Драгичево
 тел.: 07718/2340
 e-mail: minproektvs@abv.bg

version 2.0

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13 MODULE D APPROVAL




CE₁₈₇₇ “МИНПРОЕКТ” ЕАД

ОДОБРЕНИЕ

[1] **НА СИСТЕМА ПО КАЧЕСТВО**
„МОДУЛ D: СЪОТВЕТСТВИЕ С ТИПА ВЪЗ ОСНОВА НА ОСИГУРЯВАНЕ НА КАЧЕСТВОТО НА ПРОИЗВОДСТВОТО”

[2] **НАРЕДБА** за съществените изисквания и оценяване на съответствието на съоръжения и системи за защита, предназначени за използване в потенциално експлозивна атмосфера (Приета с ПМС № 47 от 15.03.2016 г., Обн., ДВ, бр. 23 от 25 март 2016 г.), въвеждаща **ДИРЕКТИВА 2014/34/ЕС (ATEX)** от 26.02.2014 г.

[3] Регистрационен номер на одобрението: **MP 16 ATEX 0171 QMS** Допълнение № 3

[4] Продукти: „PTZ коригиращо устройство за обем CF500-XYZ”; „Уред за събиране на данни от коригиращи устройства за обем на газ CF 800-х”; „Барьерни устройства, серия тип BAR100-X-Y”; „Уред за предаване на данни от трейлери за природен газ CF850.х”, „Соларен панел, тип SOLAR 100х”; „Електронно устройство към PTZ коригиращо устройство за обем, тип CF600G”
 Вид на защита: собствена безопасност “I”; капсуловане “m”
 със сертификати за „ЕС изследване на типа”:
MP 20 ATEX 0169 X; MP 20 ATEX 0177 X; MP 16 ATEX 0193 X; MP 17 ATEX 0209 X;
MP 20 ATEX 0262 X; MP 22 ATEX 0288

[5] Заявител: „Унисист инженеринг” ЕООД, гр. София, ж.к. „Дружба”, бул. „Проф. Цветан Лазаров” № 44

[6] Производител: „Унисист инженеринг” ЕООД, гр. София, ж.к. „Дружба”, бул. „Проф. Цветан Лазаров” № 44

[7] „Минпроект” ЕАД – Нотифициран орган с идентификационен № 1877 по Приложение IV в съответствие с член 21 на Директива 2014/34/ЕС (ATEX), удостоверява, че производителят притежава система по качеството в съответствие с Приложение IV на Директивата, **СЪОТВЕТСТВИЕ С ТИПА ВЪЗ ОСНОВА НА ОСИГУРЯВАНЕ НА КАЧЕСТВОТО НА ПРОИЗВОДСТВОТО**.
 Тази система по качеството в съответствие с Приложение IV на Директивата също така отговаря на изискванията на Приложение VII, **СЪОТВЕТСТВИЕ С ТИПА ВЪЗ ОСНОВА НА ОСИГУРЯВАНЕ НА КАЧЕСТВОТО НА ПРОДУКТА**.

[8] Това Одобрение се издава на основание на Доклад от одит № 171 / 31.10.2022 г. Одобрението може да бъде отнето, ако Производителят не отговаря на изискванията на Приложение IV, Директива 2014/34/ЕС (ATEX).
 Резултатите от периодичните надзори на Системата по качеството са част от това Одобрение.

[9] Това Одобрение е валидно до 22.05.2026 г. и може да бъде отнето ако Производителят не поддържа одобрената система, съгласно изискванията на Директивата.

[10] Съгласно Член 16 (3), Директива 2014/34/ЕС (ATEX), маркировката за съответствие CE, трябва да се следва от идентификационният № 1877, определящ Нотифицираният орган включен в контрола на продукта.
 Това Одобрение, може единствено да бъде възпроизведено в цялостен вид, без каквито и да е промени.

София, Дата: 22.05.2023 г.

Изп. Директор:
 /инж. Р. Биков/

“Минпроект” ЕАД, гр. София 1756, БЪЛГАРИЯ
 бул. “Климент Охридски” № 14
 тел.: 02/975-82-20, факс: 02/ 975-33-48
 e-mail: office@minproekt.com – София,
 www.minproekt.com



Направление “Научно-приложна дейност”
 тел. : 07718/2340

e-mail: minproektvs@abv.bg

14 EC TYPE EXAMINATION CERTIFICATE

УНИСИСТ ООД**Нотифициран орган за оценяване на съответствието на СИ**София 1756, ж.к. Дървеница, бл.15, вх. Г, ет.1, тел. 02/ 886 12 03, 886 05 62
Факс: 02/ 975 12 36, E-mail: office@unisyst.bg, [http:// www.unisystltd.bg](http://www.unisystltd.bg)**ЛОС „УНИСИСТ“ ООД – NB 2341**ЕО Сертификат за изследване на типа
№ BG-MI 002-15/01
EC Type examination Certificate

Страница 1 от 1

Издаден от:
Issued by:ЛОС „УНИСИСТ“ ООД
ж.к. „Дървеница“ бл.15 вх.Г ет.1
1756 София
България
Нотифициран орган №: 2341**На основание:**
In accordance with:Наредба за същественият изисквания и оценяване на
съответствието на средствата за измерване (в сила
от 01.01.2007 г.; обн. ДВ бр.80 от 3 октомври 2006 г.),
въвеждаща директива на Европейския съвет
2004/22/ЕО**Издаден на:**
Applicant:„Унисист инженеринг“ ООД
бул. „Проф. Цветан Лазаров“ № 144
гр. София
България**Заявление №**
Application №

16/10.08.2015 г.

Относно:
In Respect of:**PTZ Коригиращо устройство за обем**
Тип: CF500
Механичен клас: M2
Клас околна среда: от минус 25 °C до 55 °C
Електромагнитен клас: E2**Срок на валидност:**
Valid until:

06.10.2025 г.

Описание:
Description:Приложение, неразделна част от настоящия
сертификат**Дата на издаване:**
Date:

София, 06.10.2015 г.

Подпис:
Ръководител ЛОС:
Н.Божкова

Печат:



ЕО Сертификат за изследване на типа без подпис и печат е невалиден. Издаването на копие се допуска само изцяло
и с писмено разрешение на нотифицираният орган, издал сертификата
EC Type-examination Certificates without signature and seal are not valid. This EC Type-examination Certificate may not be reproduced
other than in full. Extracts may be taken only with the permission of the NB

15 EU DECLARATION OF CONFORMITY

УНИСИСТ®
Инженеринг ЕООД

уреди и системи за автоматизация

София 1582, бул. Проф. Цветан Лазаров № 144, тел. 02/ 886 12 03, 886 05 62, 886 32 37,
факс 02/ 975 12 36, E-mail: office@unisyst.bg, [http: www.unisyst.bg](http://www.unisyst.bg)

ЕС Декларация за съответствие

1. Модел на продукта:

PTZ Коригиращо устройство за обем
тип CF500 -
сериен №

2. Наименование и адрес на производителя:

„Унисист инженеринг“ ЕООД
София 1582
бул. „Проф. Цв. Лазаров“ № 144

3. Настоящата декларация за съответствие е издадена на отговорността на производителя.

4. Предмет на декларацията:

PTZ Коригиращо устройство за обем
тип CF500 -

5. Предметът на декларацията, описан по-горе, отговаря на съответното законодателство на Европейския съюз за хармонизация:

Директива 2014/32/ЕС за предоставяне на пазара на средства
за измерване
Директива 2014/34/ЕС относно съоръженията и системите за
защита предназначени за използване в потенциално
експлозивна атмосфера
Директива 2014/30/ЕС относно електромагнитна
съвместимост

6. Пзоваване на използваните хармонизирани стандарти, включително датата на стандарта, или позоваване на други технически спецификации, включително датата на спецификацията, по отношение на които се декларира съответствие:

БДС EN 12405-1 + A2:2011
БДС EN 60079-0:2018
БДС EN 60079-11:2012

стр. 1 от 2

7. Нотифициран орган**Нотифициран орган № 2341** (Директива 2014/32/ЕС)

„УНИСИСТ“ ООД извърши оценяване на съответствието по процедури:

- Модул В: ЕС изследване на типа и издаде Сертификат за ЕС изследване на типа № BG-MI 002-15/01
- Модул F: Съответствие с типа въз основа на проверка на продукта и издаде Сертификат за съответствие № от

Нотифициран орган № 1877 (Директива 2014/34/ЕС)

„Минпроект“ ЕАД извърши оценяване на съответствието по процедури:

- Модул В: ЕС изследване на типа и издаде Сертификат за ЕС изследване на типа № MP 20 ATEX 0169 X
- Модул D: Съответствие с типа въз основа на осигуряване на качеството на производството и издаде Одобрение на система по качество № MP 16 ATEX 0171 QMS

Подписана за и от името на: „Унисист инженеринг“ ЕООД

гр. София

.....г.

инж. Иван Йорданов
Управител

16 WARRANTIES

The warranty period of the device is 36 months from the date of manufacture.

The warranty period is not valid when the malfunction is caused by:

- improper transportation and storage;
- mechanical impacts and incorrect connection;
- intervention by unauthorized personnel;
- incorrect operation.

If you need technical or service assistance, please contact:

UNISYST Engineering Ltd.

- 144 Prof.Tzvetan Lazarov Blvd,
- j.k. Drugba 2, Sofia 1582,
- Bulgaria
- ☎ +359 2 8860562
- ☎ +359 2 8861203
- ☎ +359 2 8863237
- 📠 +359 2 9751236
- E-mail: office@unisyst.bg

The production of the CF500-XYZ devices is in accordance with the requirements of an implemented and functioning quality management system according to BDS EN ISO 9001:2015. The management system is certified by SGS United Kingdom Ltd. and approved by "Minproekt" EAD, a notified body under Directive 2014/34/EU.

17 ASSPORT

WARRANTY CARD

of device type CF500-..... serial No.:

Date of manufacture: year

User:

The device has been checked and meets the technical data and requirements.

Checked:

(surname, signature, stamp)

18 USER PASSWORDS

- parameters – 1000000;
- configuration – 2200000;
- setting the clock – 3330000;
- calibration – 1203000;
-



UNISYST Engineering Ltd.

Instrumentation & Process Control System

1582 Sofia, Bulgaria, j.k.Druzba 2, 144 Prof. Tzvetan Lazarov

Phone: +359 (2) 886 12 03, 886 05 62, 886 32 37

Fax: (02) 9751236

E-mail: office@unisyst.bg

<https://www.unisyst.bg>