STERYLIZATORY UV DO WODY I POWIETRZA

WYPRODUKOWANO W POLSCE / MADE IN POLAND

6-CHANNEL ALARM SYSTEM VER.4

MANUAL

VERSION - December 2025

SPIS TREŚCI

1. USER SAFETY

READ THE INSTRUCTIONS

Before using UV sterilizers, all personnel must read the operating instructions. These instructions must be followed throughout the life of the device. All user restrictions and limitations apply.

POWER SUPPLY

Device is exclusively designed to be supplied from 220-230V 50Hz mains. It shall be installed and grounded in accordance with this manual and the local electrical code.
To guard against electrical shock, unplug the device every time work is to be done on it.

GROUNDING

Operation of the device without connected grounding is inadmissible. Ungrounded operation might lead to occurrence of electrical shock and serious bodily harm with death included.

SAFETY SERVICE

Operating the device without the housing installed is prohibited, as this may result in electric shock. All repairs must be performed only by the manufacturer's service center. Repairs performed by an unauthorized person will void the warranty.

Used electrical and electronic equipment marked with the crossed-out waste bin symbol should be collected selectively. It is prohibited to dispose of used equipment with other waste. Improper use of used equipment can negatively impact the environment and human health. Selective equipment collection contributes to its reuse and recovery, including recycling. The responsibility for selectively collecting used equipment rests with the user, who should return it to a waste equipment collector.

2. INTRODUCTION

The 6-channel alarm system ver.4 is used exclusively to monitor the operation of UV lamps installed in TMA UV sterilizers. It is a dedicated device for the following product series:

- TM series - AMX series
- AP-POOL-N series
- AP-POOL-X series
- AM series (archived)
- AP-POOL series (archived)

The alarm system selectively checks the real-time operating/fault status of each connected UV lamp. The operation of one UV lamp does not affect the operation of other UV lamps in any way. The alarm system consists of the following components:

1) Touchscreen display
2) Alarm system ver.4 6k – controller
3) Alarm system ver.4 6k – power supply

The device must have all of these components for proper operation. The absence or damage of any one component may result in the malfunction of the entire device.

Key features of the alarm system:
- Monitoring the operation of UV lamps (up to 24).
- Light indication of UV lamp failure (selective).
- Audible indication of UV lamp failure.
- Remaining operating time counter.
- Total operating time counter.
- Number of starts counter.
- Language selection: Polish, English, German.
- Error history.
- Digital output: Modbus communication.
- Analog output 4-20mA (indicating the operating status of UV lamps)
- Relay output: system operation control
- Relay output: peripheral device operation

3. SYSTEM DESCRIPTION

3.1. START SCREEN

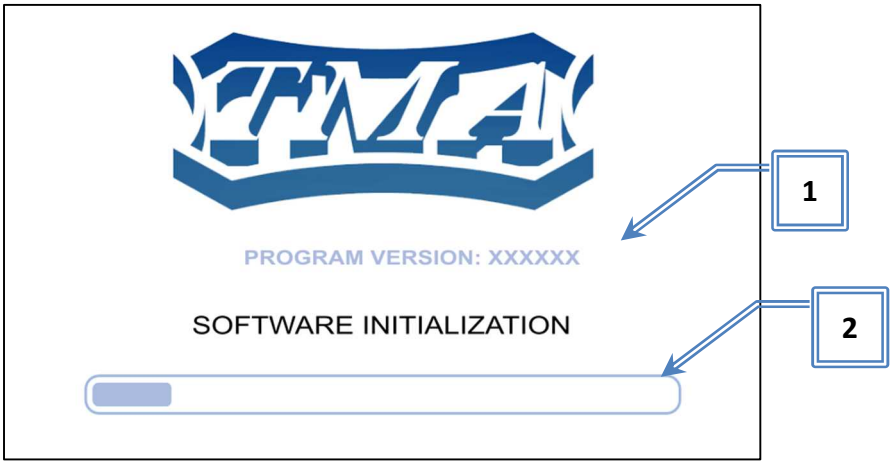

Figure 1 – START SCREEN

NO.	DESCRIPTION
1	SOFTWARE VERSION INFORMATION
2	SYSTEM BOOT PROGRESS BAR

3.2. MESSAGES

THE FOLLOWING MESSAGES MAY APPEAR ON THE DEVICE:

3.2.1. INFORMATION MESSAGES:

INFORMATION

THIS MESSAGE APPEARS AFTER THE DEVICE HAS BEEN STARTED CORRECTLY. IT DOES NOT NEED TO BE CONFIRMED. AFTER A FEW SECONDS, THE DEVICE AUTOMATICALLY GOES TO THE HOME SCREEN.

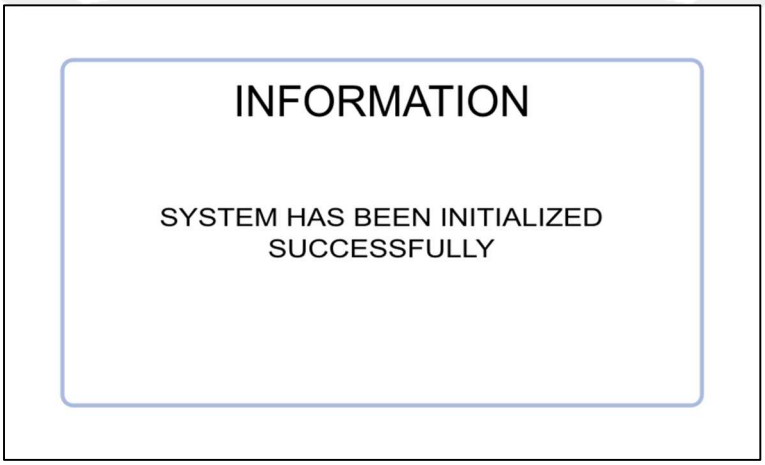

Figure 2 – INFORMATION: CORRECT SYSTEM STARTUP

3.2.2. WARNING MESSAGES:

APPROACHING THE EXPIRATION PERIOD

THIS MESSAGE APPEARS WHEN THE REMAINING RUNTIME COUNTER REACHES LESS THAN 14 DAYS. ANOTHER MESSAGE APPEARS WHEN THE COUNTER REACHES LESS THAN 7 DAYS.

Figure 3 – WARNING 1

THE DURABILITY PERIOD HAS EXPIRED.

THE MESSAGE APPEARS WHEN THE REMAINING OPERATING TIME COUNTER REACHES "0". ACCEPTING THE MESSAGE POSTPONES THE WARNING FOR 24 HOURS.

Figure 4 – WARNING 2

3.2.3. ALARM MESSAGES:

DAMAGED UV LAMP

IF ANY OF THE UV LAMPS IN THE DEVICE HAS FAILED, THE FOLLOWING MESSAGE APPEARS ON THE SCREEN. ACCEPTING THE MESSAGE WILL MUTE THE AUDIBLE ALARM FOR 24 HOURS. TO CORRECT THE ERROR, CHECK THE OPERATION OF THE UV LAMP AND, IF NECESSARY, REPLACE IT WITH A NEW ONE.

Figure 5 -ERROR 1

COMMUNICATION ERROR

The following screen appears when any of the system components is incorrectly connected or has failed. This error also occurs if the software for each component is incompatible with the other.

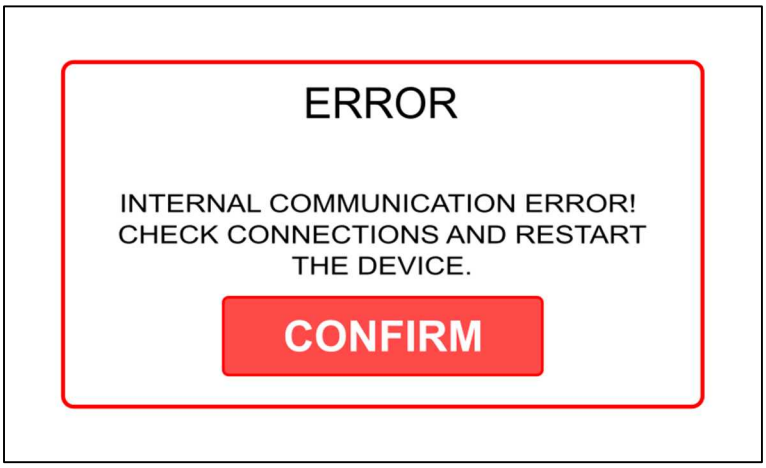

Figure 6 - ERROR 2

3.3. MAIN SCREEN

MAIN SCREEN SHOWING THE OPERATIONAL STATUS OF THE ENTIRE DEVICE.

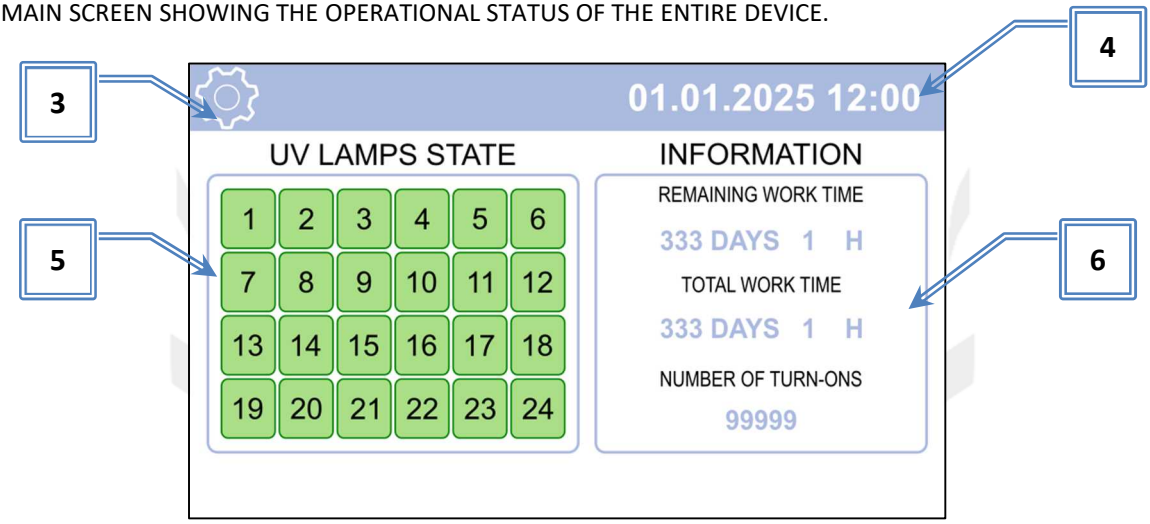

Figure 7 – MAIN SCREEN

NO.	DESCRIBTION
3	MENU SELECTION BUTTON
4	CURRENT DATE AND TIME
5	UV LAMP OPERATION CHECK: - UV LAMP PROPER OPERATION - WARNING: UV LAMP IS COMING TO THE END OF LIFE - UV LAMP FAILURE - CHECKING UV LAMP OPERATIONAL STATUS
6	INFORMATION FIELD CONTAINS: - UV LAMP REMAINING TIME COUNTER - TOTAL DEVICE OPERATION TIME COUNTER - NUMBER OF TURN-ON COUNTERS SINCE THE LAST COUNTER RESET

3.4. MENU

3.4.1. LOGIN SCREEN

TO ENTER THE MENU, USE THE 4-DIGITAL USER CODE.AFTER ENTERING THE CORRECT CODE, THE DEVICE AUTOMATICALLY GOES TO THE MAIN MENU.LOGIN CODE: **1234**.

IF YOU ENTER INCORRECT NUMBERS WHILE ENTERING THE CODE, GO BACK TO THE HOME SCREEN AND START ENTERING THE CODE FROM THE BEGINNING.

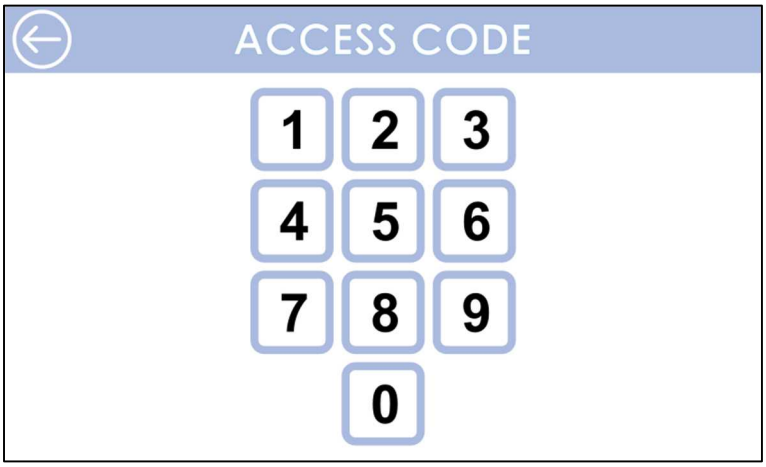

Figure 8 – LOGIN SCREEN

3.4.2. USER MENU

MAIN SCREEN ALLOWING SURROUNDING TO INDIVIDUAL DEVICE SETTINGS.
THE FOLLOWING SETTINGS/PARAMETERS ARE AVAILABLE:

- SELECTING THE LANGUAGE
- CHANGING THE SCREEN BRIGHTNESS
- SETTING THE DATE AND TIME
- RESETTING THE OPERATIONAL TIME COUNTER AND THE NUMBER OF ACTIVATIONS
- VIEWING THE ALARM HISTORY
- CONTROLLING PERIPHERAL DEVICES
- VIEWING INFORMATION + CALIBRATING THE ANALOG SIGNAL
- SETTING COMMUNICATION PARAMETERS

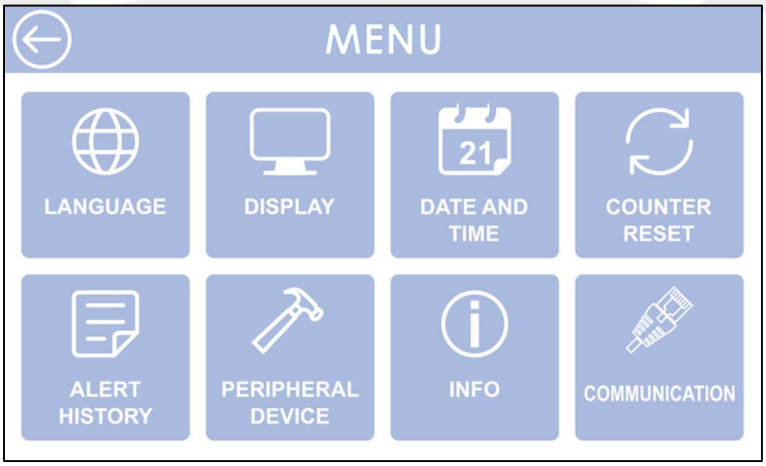

Figure 9 – USER MENU

3.4.3. LANGUAGE

POSSIBILITY TO CHOOSE ONE OF 3 LANGUAGES: POLISH, ENGLISH, GERMAN.

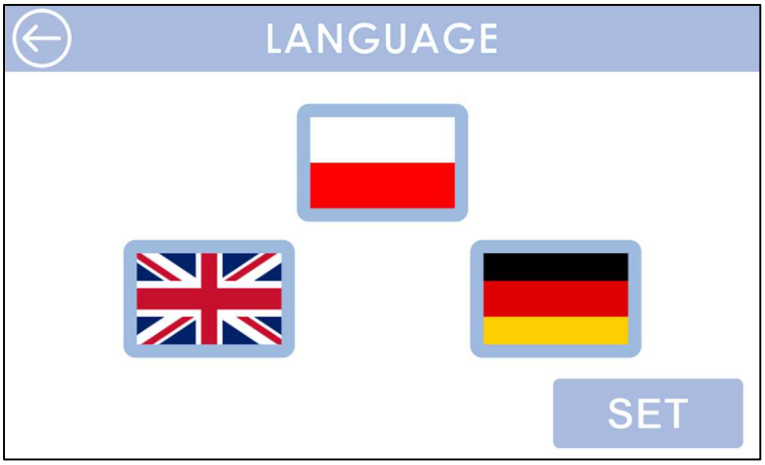

Figure 10 – LANGUAGE SELECTION

3.4.4. DISPLAY

CHANGING SCREEN BRIGHTNESS IN THE RANGE OF 0-100%.

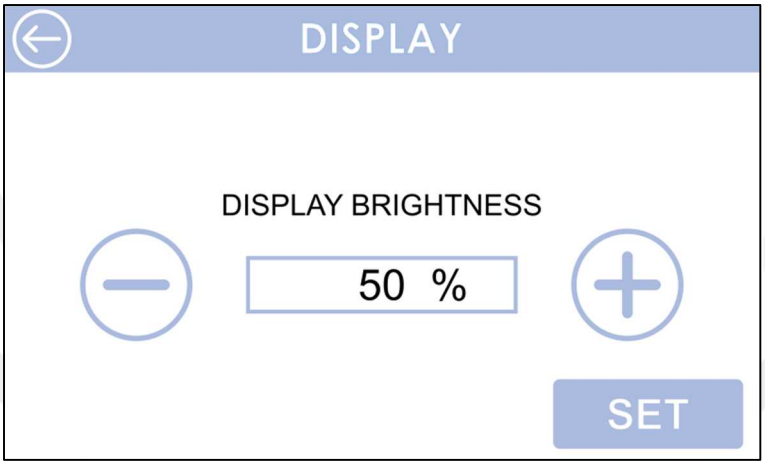

Figure 11 – SCREEN BRIGHTNESS

3.4.5. DATE AND TIME

SETTING THE DATE AND TIME.

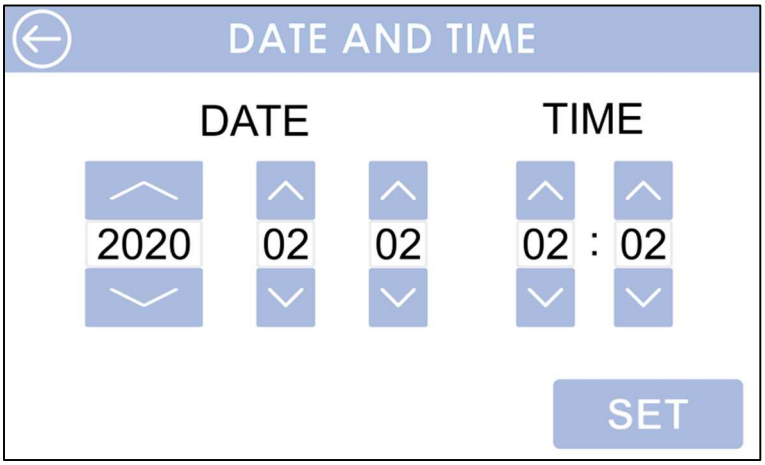

Figure 12 - SETTING THE DATE AND TIME.

3.4.6. COUNTER RESET

RESETTING THE COUNTER SHOULD ONLY BE CARRIED OUT AFTER **REPLACING ALL UV LAMPS** IN THE DEVICE. IN EXCEPTIONAL SITUATIONS, PLEASE CONTACT THE DEALER/MANUFACTURER.

RESETTING THE COUNTER REQUIRES DOUBLE CONFIRMATION OF THE MESSAGES. THIS OPERATION CANNOT BE UNDONE! RESETTING THE COUNTER ERASES THE REMAINING OPERATION TIME COUNTER AND THE NUMBER OF STARTS COUNTER.

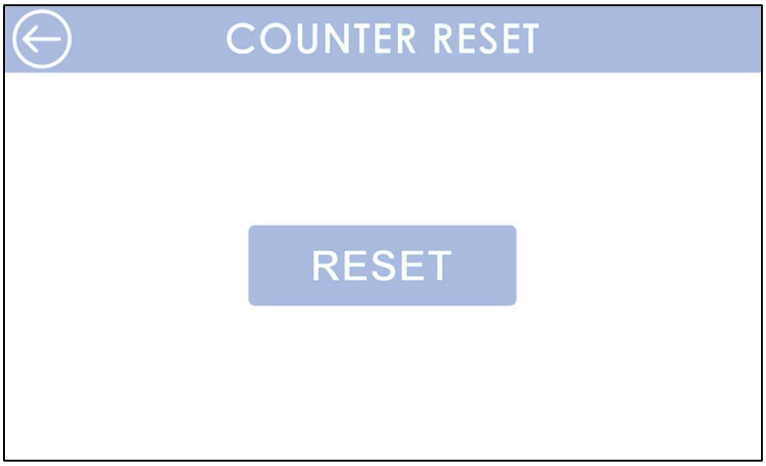

Figure 13 – COUNTER RESET 1

Figure 14 - COUNTER RESET 2

3.4.7. ALARM HISTORY

IN THIS WINDOW, YOU CAN CHECK THE HISTORY OF RECENT EVENTS THAT OCCURRED DURING THE DEVICE'S OPERATION. EACH MESSAGE IS ASSIGNED THE DATE OF THE **FIRST OCCURRENCE** OF THE EVENT, A NUMERICAL CODE, AND A SHORT TEXT DESCRIPTION. THE CODE DESCRIPTION CAN BE CHECKED BY SELECTING THE "LEGEND" BUTTON. THE "RESET" BUTTON CLEARS ALL MESSAGES.

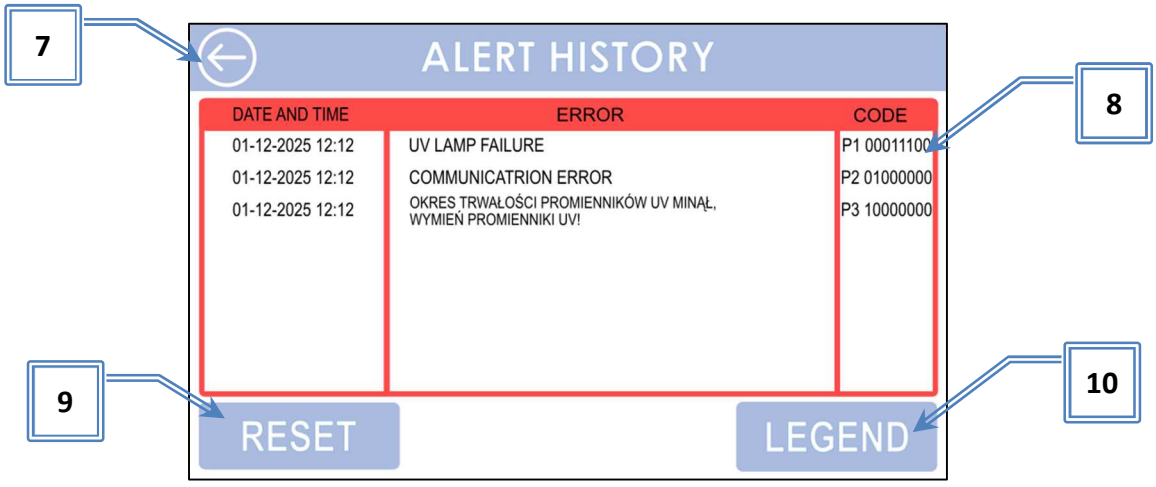

Figure 15 – ALARM HISTORY

NO.	DESCRIPTION
7	BACK TO MENU SELECTION
8	WINDOW WITH MESSAGE LIST
9	ALARM LIST RESET BUTTON
10	LEGEND SELECTION BUTTON WITH ALARM CODE DESCRIPTION

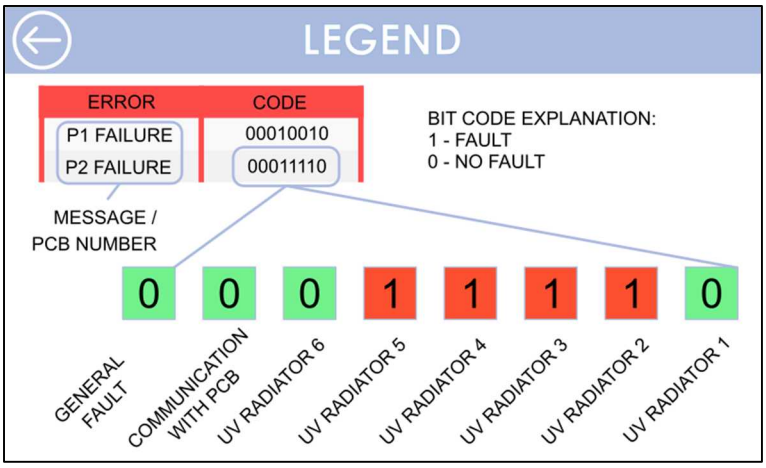

Figure 16 - LEGEND

3.4.8. PERIPHERAL DEVICES

THIS IS WHERE THE RELAY OUTPUT IS CONTROLLED, WHICH CAN BE USED TO CONTROL EXTERNAL PERIPHERAL DEVICES, SUCH AS A CIRCULATION PUMP.

ONCE ACTIVATED, THE RELAY CONTACT OPERATES CYCLICALLY ACCORDING TO THE SET OPERATING TIME (HH:MM).

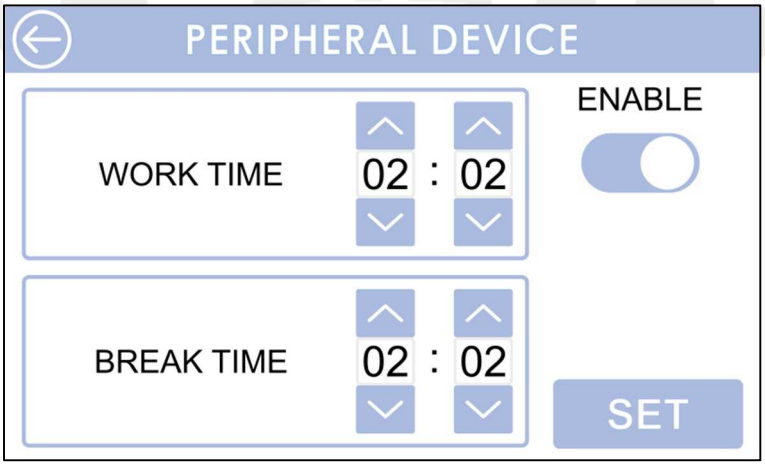

Figure 17 – PERIPHERAL DEVICE

Note: The relay contacts accept a wire with a cross-section of 0.25 – 2.5 mm2 (23-12 AWG). The maximum load of the relay is 15 A (with a resistive load and a voltage of 24 V DC / 120 V AC).

3.4.9. INFORMATION

ON THIS SCREEN, YOU CAN CHECK ALL THE INFORMATION ABOUT THE CURRENT OPERATION OF THE DEVICE (THE SAME INFORMATION IS TRANSMITTED VIA THE DIGITAL OUTPUT).

AFTER SELECTING THE "CURRENT LOOP CURRENT" BUTTON, YOU CAN CALIBRATE THE ANALOG SIGNAL.

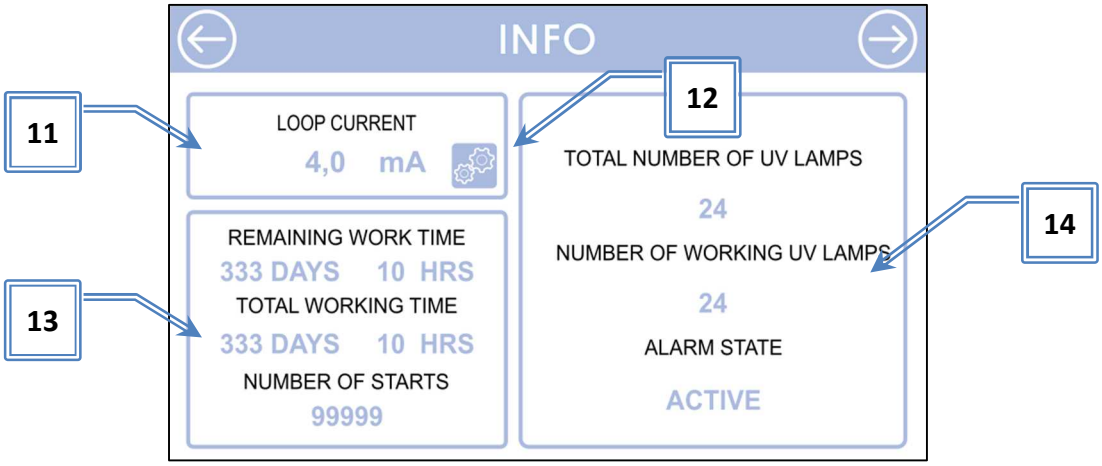

Figure 18 – INFORMACION

NO.	DESCRIPTION
11	CURRENT ANALOG OUTPUT CURRENT (CALCULATED VALUE)
12	ANALOG OUTPUT CALIBRATION BUTTON
13	FIELD WITH INFORMATION ABOUT COUNTERS
14	FIELD WITH INFORMATION ABOUT UV LAMP OPERATION AND THE STATUS OF THE RELAY ALARM OUTPUT

3.4.10. ANALOGUE OUTPUT CALIBRATION (4-20mA)

TO PRECISELY SET THE ANALOG OUTPUT, CONSIDER TWO CASES – WHEN ALL THE UV LAMPS ARE FUNCTIONAL AND WHEN ALL ARE DAMAGED. IN THE FIRST CASE, CHECK THE DEVICE DURING NORMAL OPERATION (ALL UV LAMPS MUST BE FUNCTIONAL). IN THE SECOND CASE, PHYSICALLY DISCONNECT ALL UV LAMPS FROM THE CONTROL CABINET AND POWER ON THE DEVICE. ANALOG OUTPUT VALUE IS CHANGED USING THE ARROW KEYS.

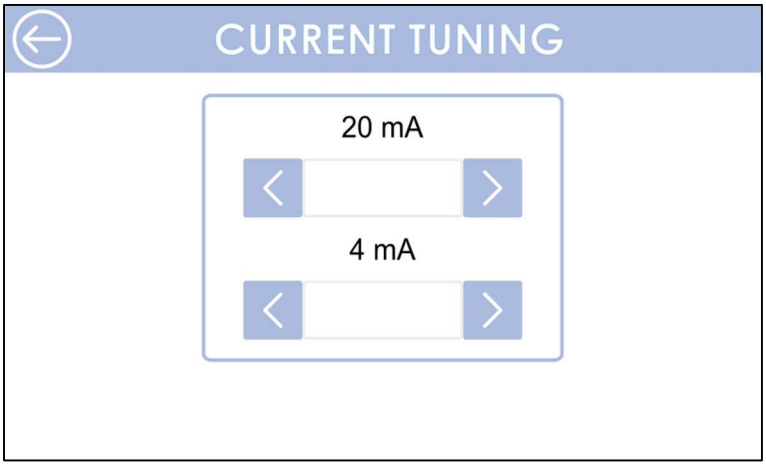

Figure 19 – CURRENT CORRECTION

THE VALUE OF THE ANALOG OUTPUT DEPENDS ON THE TOTAL NUMBER OF UV LAMPS IN OPERATION AND THE NUMBER OF UV LAMPS THAT ARE IN OPERATION OR FAULTY. THE VALUE OF THIS SIGNAL PROVIDES AN APPROXIMATE INDICATION OF THE OPERATING STATUS OF THE ENTIRE UV STERILIZER.

IF ALL UV LAMPS ARE FAULTY -> THE CURRENT SIGNAL STATUS IS 4mA

IF ALL UV LAMPS ARE FUNCTIONAL -> THE CURRENT SIGNAL STATUS IS 20mA

FOR ALL OTHER INTERMEDIATE STATUS, THE ANALOG SIGNAL VALUES ARE PRESENTED IN THE TABLE BELOW.

THE NUMBERS IN THE TABLE REPRESENT THE CURRENT VALUE IN "mA" OF THE ANALOG OUTPUT.
PV NUMBER – TOTAL NUMBER OF LAMPS IN THE UV STERILIZER

EXAMPLE 1:

THE UV STERILIZER HAS 6 UV LAMPS (MODEL TM6). ONE OF THE UV LAMPS IS FAULTY. THE ANALOG OUTPUT SIGNAL VALUE IS 17.33 mA (MARKED IN GREEN IN THE TABLE BELOW).

EXAMPLE 2:

THE UV STERILIZER HAS 12 UV LAMPS (MODEL AMX 12). DUE TO A FAILURE, 6 UV LAMPS WERE DAMAGED. THE ANALOG OUTPUT SIGNAL VALUE IS = 12.00 mA (MARKED IN BLUE IN THE TABLE BELOW).

	NUMBER OF DAMAGED UV LAMPS																							
No UV LAMPS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	20,00	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	20,00	12,00	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	20,00	14,67	9,33	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	20,00	16,00	12,00	8,00	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	20,00	16,80	13,60	10,40	7,20	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	20,00	17,33	14,67	12,00	9,33	6,67	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	20,00	17,71	15,43	13,14	10,86	8,57	6,29	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	20,00	18,00	16,00	14,00	12,00	10,00	8,00	6,00	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	20,00	18,22	16,44	14,67	12,89	11,11	9,33	7,56	5,78	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	20,00	18,40	16,80	15,20	13,60	12,00	10,40	8,80	7,20	5,60	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	20,00	18,55	17,09	15,64	14,18	12,73	11,27	9,82	8,36	6,91	5,45	4,00	-	-	-	-	-	-	-	-	-	-	-	-	-
12	20,00	18,67	17,33	16,00	14,67	13,33	12,00	10,67	9,33	8,00	6,67	5,33	4,00	-	-	-	-	-	-	-	-	-	-	-	-
13	20,00	18,77	17,54	16,31	15,08	13,85	12,62	11,38	10,15	8,92	7,69	6,46	5,23	4,00	-	-	-	-	-	-	-	-	-	-	-
14	20,00	18,86	17,71	16,57	15,43	14,29	13,14	12,00	10,86	9,71	8,57	7,43	6,29	5,14	4,00	-	-	-	-	-	-	-	-	-	-
15	20,00	18,93	17,87	16,80	15,73	14,67	13,60	12,53	11,47	10,40	9,33	8,27	7,20	6,13	5,07	4,00	-	-	-	-	-	-	-	-	-
16	20,00	19,00	18,00	17,00	16,00	15,00	14,00	13,00	12,00	11,00	10,00	9,00	8,00	7,00	6,00	5,00	4,00	-	-	-	-	-	-	-	-
17	20,00	19,06	18,12	17,18	16,24	15,29	14,35	13,41	12,47	11,53	10,59	9,65	8,71	7,76	6,82	5,88	4,94	4,00	-	-	-	-	-	-	-
18	20,00	19,11	18,22	17,33	16,44	15,56	14,67	13,78	12,89	12,00	11,11	10,22	9,33	8,44	7,56	6,67	5,78	4,89	4,00	-	-	-	-	-	-
19	20,00	19,16	18,32	17,47	16,63	15,79	14,95	14,11	13,26	12,42	11,58	10,74	9,89	9,05	8,21	7,37	6,53	5,68	4,84	4,00	-	-	-	-	-
20	20,00	19,20	18,40	17,60	16,80	16,00	15,20	14,40	13,60	12,80	12,00	11,20	10,40	9,60	8,80	8,00	7,20	6,40	5,60	4,80	4,00	-	-	-	-
21	20,00	19,24	18,48	17,71	16,95	16,19	15,43	14,67	13,90	13,14	12,38	11,62	10,86	10,10	9,33	8,57	7,81	7,05	6,29	5,52	4,76	4,00	-	-	-
22	20,00	19,27	18,55	17,82	17,09	16,36	15,64	14,91	14,18	13,45	12,73	12,00	11,27	10,55	9,82	9,09	8,36	7,64	6,91	6,18	5,45	4,73	4,00	-	-
23	20,00	19,30	18,61	17,91	17,22	16,52	15,83	15,13	14,43	13,74	13,04	12,35	11,65	10,96	10,26	9,57	8,87	8,17	7,48	6,78	6,09	5,39	4,70	4,00	-
24	20,00	19,33	18,67	18,00	17,33	16,67	16,00	15,33	14,67	14,00	13,33	12,67	12,00	11,33	10,67	10,00	9,33	8,67	8,00	7,33	6,67	6,00	5,33	4,67	4,00

TMA | Białostoczek 26 ,15-592 Białostoczek; Poland; biuro@tma.pl
VAT EU PL5420008413; GIOŚ: E0021166WZ;

3.4.11. COMMUNICATION

SCREEN FOR SETTING DEVICE COMMUNICATION PARAMETERS VIA THE MODBUS RTU SERIAL COMMUNICATION PROTOCOL. IT IS POSSIBLE TO CHANGE THE BAUD RATE, MODBUS ADDRESS, AND RESPONSE DELAY.

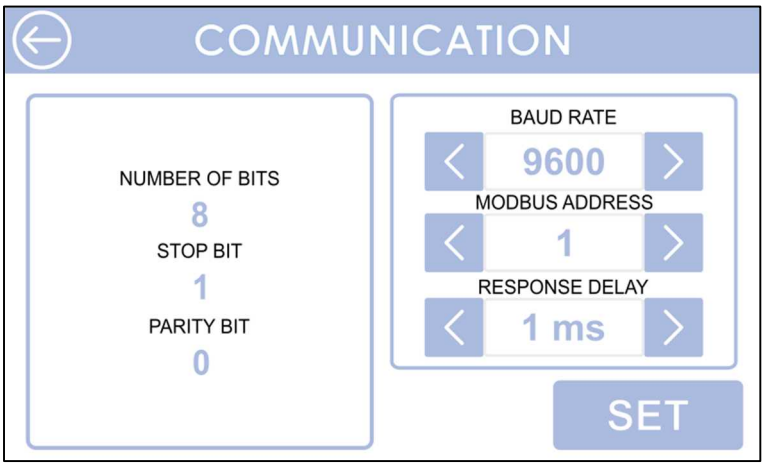

Figure 20 – COMMUNICATION

4. MODBUS RTU REGISTER MAP

(BIT ORDER: **BIG ENDIAN**)

4.1. READ INPUT REGISTERS (FC4)

ADDRESS [HEX]	ADDRESS [DEC]	BYTE NUMBER	DESCRIPTION
0x0000	0	2	REMAINING OPERATION TIME COUNTER
0x0001	1	2	NUMBER OF STARTS COUNTER
0x0002	2	4	MSW: TOTAL OPERATION TIME COUNTER
0x0003	3	4	LSW: TOTAL OPERATION TIME COUNTER
0x0004	4	2	MSB: NUMBER OF PROGRAMMED UV LAMPS; LSB: NUMBER OF OPERATING UV LAMPS
0x0005	5	2	P1 BOARD CONFIGURATION[1]
0x0006	6	2	P2 BOARD CONFIGURATION[1]
0x0007	7	2	P3 BOARD CONFIGURATION[1]
0x0008	8	2	P4 BOARD CONFIGURATION[1]
0x0009	9	2	RELAY STATUS, MESSAGES[2]
0x000A	10	4	MSW: PHASE LOSS COUNTER
0x000B	11	4	LSW: PHASE LOSS COUNTER

1) BOARD CONFIGURATION:

BYTE NUMBER	BIT NUMBER	DESCRIPTION
1	7	PLATE CONFIGURATION (0 – NOT CONFIGURED; 1 – CONFIGURED)
1	6	UNUSED
1	5	RADIATOR 6 CONFIGURATION (0 – NOT CONFIGURED; 1 – CONFIGURED)
1	4	RADIATOR 5 CONFIGURATION (0 – NOT CONFIGURED; 1 – CONFIGURED)
1	3	RADIATOR 4 CONFIGURATION (0 – NOT CONFIGURED; 1 – CONFIGURED)
1	2	RADIATOR 3 CONFIGURATION (0 – NOT CONFIGURED; 1 – CONFIGURED)
1	1	RADIATOR 2 CONFIGURATION (0 – NOT CONFIGURED; 1 – CONFIGURED)
1	0	RADIATOR 1 CONFIGURATION (0 – NOT CONFIGURED; 1 – CONFIGURED)
2	7	COMMUNICATION WITH BOARD (0-NO COMMUNICATION; 1-COMMUNICATION CORRECT)
2	6	BOARD OPERATION (0-BOARD DAMAGE; 1-CORRECT OPERATION)
2	5	RADIATOR 6 ACTIVITY (0-INACTIVE; 1-ACTIVE)
2	4	RADIATOR 5 ACTIVITY (0-INACTIVE; 1-ACTIVE)
2	3	RADIATOR 4 ACTIVITY (0-INACTIVE; 1-ACTIVE)
2	2	RADIATOR 3 ACTIVITY (0-INACTIVE; 1-ACTIVE)
2	1	RADIATOR 2 ACTIVITY (0-INACTIVE; 1-ACTIVE)
2	0	RADIATOR 1 ACTIVITY (0-INACTIVE; 1-ACTIVE)

2) RELAY STATUS, MESSAGES[2]:

BYTE NUMBER	BIT NUMBER	DESCRIPTION
2	7	DEVICE STATUS (0 – OPERATION PROPERLY; 1 – FAILURE)
2	6	REMAINING OPERATION TIME LESS THAN 14 DAYS
2	5	UNUSED
2	4	UNUSED
2	3	SPEAKER STATUS (0 – NOT MUTED; 1 – MUTED)
2	2	SPEAKER STATUS (0 – INACTIVE; 1 – ACTIVE)
2	1	P2 RELAY STATUS (0 – INACTIVE; 1 – ACTIVE)
2	0	P1 RELAY STATUS (0 – INACTIVE; 1 – ACTIVE)

4.2. READ MULTIPLE HOLDING REGISTERS (FC3)

ADDRESS [HEX]	ADDRESS [DEC]	DESCRIPTION
0x0100	256	P2 RELAY STATUS: 0 - INACTIVE 1 - ACTIVE
0x0101	257	P2 RELAY ACTIVITY TIME (0 - 32767 MINUTES)
0x0102	258	P2 RELAY OFF TIME (0 - 32767 MINUTES)