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InterPuls Universal Controller
IUC48 24VDC



Control

Technician and User Instruction Manual

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1 GENERAL INFORMATION

1.1 Manufacturer

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1.2 Copyright

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2 GENERAL WARNINGS

2.1 General information and safety warnings

2.1.1 Important warnings

To safeguard the operator and prevent any damage to the equipment, before carrying out any kind of operation it is important to have read and fully understood the instruction manual.

2.1.2 Symbol used in this manual

The following symbols are used in this manual to highlight indications and warnings which are of particular importance:



WARNING
This symbol indicates health and safety regulations designed to protect operators and/or any exposed persons.



CAUTION
This symbol indicates that there is a risk of causing damage to the equipment and/or its components.



NOTE
This symbol is used to highlight useful information.

2.1.3 Rules and regulations for the user



WARNING
Any failure to observe the warnings provided in this manual may lead to equipment malfunctions or damage to the system.

2.1.4 Limitation of liability

InterPuls S.p.A. declines all liability for damage to persons, animals and/or things caused by incorrect use of the equipment.

2.2 Prior using the product

2.2.1 Requirements and rules for personnel and Safety Rules



WARNING
This appliance can be used by person aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved

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WARNING
Before using the device, the operator must carefully read the manual.
During the assembly and activation of the device, follow the instructions in the manual and rules and regulations applying to health and safety at the workplace.

WARNING
Children shall not play with the appliance.
Cleaning and user maintenance shall not be made by children without supervision.

2.2.2 Connection

WARNING
Stationary appliances not fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, the instructions state that means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules

2.3 Disposal

2.3.1 General regulation



Since the device is a EEE product, it must not be disposed of as urban waste, but must be managed by a separate waste connection centre through specific WEEE waste collection systems.
Proper disposal of the product will contribute to protecting the environment.

2.4 Fire prevention

2.4.1 Fire prevention

NOTE
The machine is not equipped with fire extinguishers.
The operator must make sure that the place in which the appliance is installed is equipped with an adequate number of suitable fire extinguishers. The extinguishers must be positioned where they are clearly visible and protected from damage and improper use.

2.4.2 Safety regulations

WARNING
It is strictly prohibited to extinguish fires involving electrical equipment with water!

2.4.3 Characteristic of extinguishers

Use powder, foam or halogen extinguishers which must be positioned next to the device.
Operating personnel must receive adequate instruction on how to use the extinguishers.

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2.5 Normative references applied

Europe:

- Directive no. 2014/30/EU Electromagnetic Compatibility (EMC)
- Directive no. 2014/35/EU Low Voltage (LVD)
- Directive no. 2011/65/EC Restrictions of the use of certain hazardous substances in electrical and electronic equipment (RoHS II)
- Directive WEEE Waste Electrical & Electronic Equipment

UK:

- UKCA (UK Conformity Assessed)

USA:

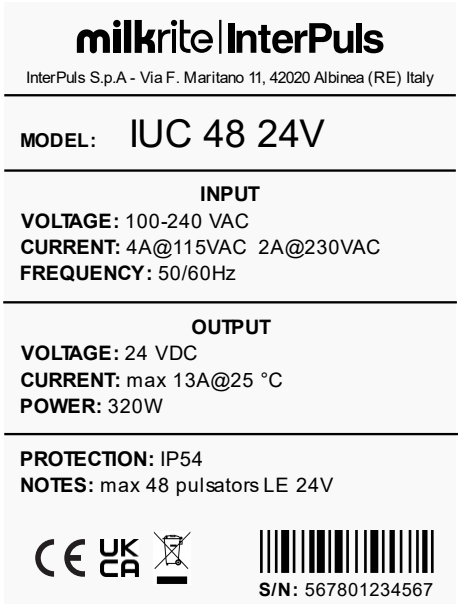
- FCC Federal Communications Commission
- UL Underwriters Laboratories

Canada:

- IC Industry Canada
- CSA Canadian Standards Association

2.6 Marking

2.6.1 Dataplates affixed to the device



2.7 Safety decals



WARNING
The removal or damaging of safety decals is strictly prohibited.

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3 DESCRIPTION OF THE DEVICE

3.1 General features

The IUC48 InterPuls is a control box equipped with a switching transformer used to supply power to the electrical pulsator with a 24 VDC 13A output at a maximum of 25°C (77°F).

It is capable of supplying power to a maximum of 48 pulsators (Front & Rear) divided in 4 channels (maximum of 12 pulsators per channel).

Every pulsator is equipped with two coils: one Rear and one Front controlled by duty-cycles programmable within a 10÷90 (90÷10) range and with a programmable frequency of between 30 and 260 pulsations/minute.
Maximum absorption of every coil: 3.6W at 24VDC (absorption approximately 150mAcc).

Every channel must supply a nominal of 3.6A (two coils simultaneously for 12 pulsators) and has a maximum power supply limit set by the controlling CPU of approximately 3A +10% -0%.

The device uses the classic switching technology and therefore absorbs the current with almost unitary power as per the norms in force in Europe (EN61000 and derivatives).

- Rapid response to rate of loading
- Reduced dimensions

The convertor is carried out at high frequency to reduce electrical component and packaging waste.

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4 TECHNICAL CHARACTERISTICS

Model	InterPuls IUC48 24VDC
Software version	4.09
Entry voltage	Da 100 a 240 VAC
Frequency	50-60 Hz
Electrical output at workspace extremities	> 80%
Power supply for Pulsator with exit	24VDC 13 A max @ 25°C (77°F)
Max N° of powerable Pulsators	48
Programmable pulsation frequency	Da 30 a 260 ppm
Max absorption per coil	3,6W a 24VDC (≈ 150mAcc)
Average absorption per coil	3,2W a 24VDC (≈ 130mAcc)
Dimensions (LxWxH)	370 x 265 x 145 mm (14.56 x 10.43 x 5.7 in)

When switched on the first line of the screen reads **“InterPuls”** and the second displays the **software version installed**.

4.1 Power supply

Power supply	100÷240Vac 50/60Hz with filter for standard interferences
Current absorption	4A @ 115Vac _ 2A @ 230Vac
Network connection	Three-pole connector with screw terminals (included)
Fuses on the network	Two 6.3A (T)
Exit voltage	24VDC @ 13A max
Pulsator connection	The pulsators are connected via three terminals for each FCR channel

NOTE
The power supply does not require an adaptor transformer.

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4.2 Programmable parameters

4.2.1 Pulsation parameters

IUC48 allows the following pulsator parameters to be set to operate pulsators not equipped with programmable boards (e.g. InterPuls LE):

- **FREQ.:** pulsation frequency
- **RATIO:** power current rate between Front and Rear channel
- **PHASE:** phase displacement of power current “cascaded” via the groups of pulsators
- **REVERSE:** activation of reverse ON and OFF timings of the pulsator coils
- **START DELAY:** start delay of the pulsation



NOTE:
For the programming options refer to chapter *6.2 - Menu 1.1 & Menu 1.2 - Setup Pulsation Parameters SET1 and SET2*

4.2.2 Other programmable parameters

- **COUNTER:** setting of number of operating hours before next periodic check



NOTE:
For the programming options refer to chapter *6.2.6 - Menu 1.3 - Operating Hours Counter*

- **LANGUAGE:** setting of the menu language



NOTE:
For the programming options refer to chapter *6.2.13 - Menu 1.8 – Setting the Language*

4.3 Visible parameters

- **VOLTAGE:** view the voltage supplied to the pulsators



NOTE:
For the programming options refer to chapter *6.2.9 - Menu 1.4 – Pulsators Current Voltage*

- **CURRENT:** view power current absorbed on each channel by the pulsators



NOTE:
For the programming options refer to chapter *6.2.10 - Menu 1.5 – Current Supplied*

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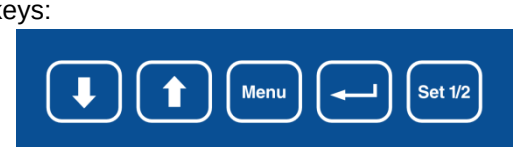
4.4 Range of values

SET1 & SET2		
Parameter	**Default settings**	**Selectable values**
FREQ.	60	30÷260 Pulsation/minute
RATIOF	60-40	10-90 ÷ 90-10 Front
RATIOR	60-40	10-90 ÷ 90-10 Rear
PHASE	T/5	T - T/2 - T/3 - T/4 - T/5 - T/6 - T/7 - T/8
REVERSE	OFF	ON / OFF
CONTATORE		
Parameter	**Default settings**	**Selectable values**
SERVICE	5000	0÷9999 h
LINGUA		
Parameter	**Default settings**	**Selectable values**
LANGUAGE	ENGLISH	ITALIANO - ENGLISH - DEUTSCH - - FRANCAIS - ESPANOL
RITARDO AVVIO		
Parameter	**Default settings**	**Selectable values**
START DELAY	10sec	OFF – 5sec – 10sec – 15sec – 20sec – 25sec

4.5 Keypad

4.5.1 Keypad layout

The keypad is equipped with 5 keys:



4.5.2 Key features

The keys allow you to:

 Scroll menus/parameter modifications



Enter menu/return to previous menu

 Modify/confirm



Selection of parameter set 1 or 2 (hold down for 3 seconds).

4.5.3 Settings selectable by the user

Change settings and check correct operation of the power supply/pulsator via the screen and the keys on the cover.
Select group options SET1 and SET2 via remote control (optional).

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5 CONNECTION AND INSTALLATION

5.1 Wall mounting of control box

The control box can be wall mounted or fixed to an appropriate support using screws.



Figure 3

NOTE:
Screws are not supplied

NOTE
At the end of the manual you can find:
- **The drilling template for the support**
- **The measurement of the distance between the fastening holes**

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5.2 Cover opening

To remove the cover, unscrew the 6 screws positioned on the side of the cover.

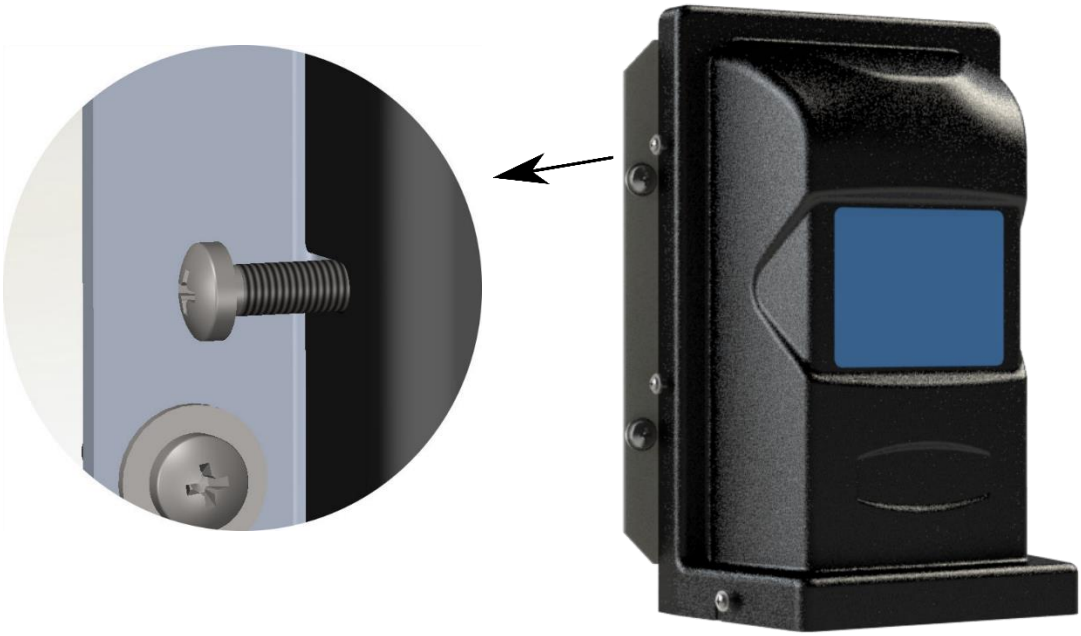


Figure 4

WARNING: TURN OFF CURRENT

Before opening the cover for the IUC must be removed from the power supply.

WARNING

Do not completely remove the screws from the cover.
The length of the screws allows the cover to be removed without them being unscrewed completely.

5.3 Cover removal

Remove cover as shown taking care not to touch any of the components inside the control box.

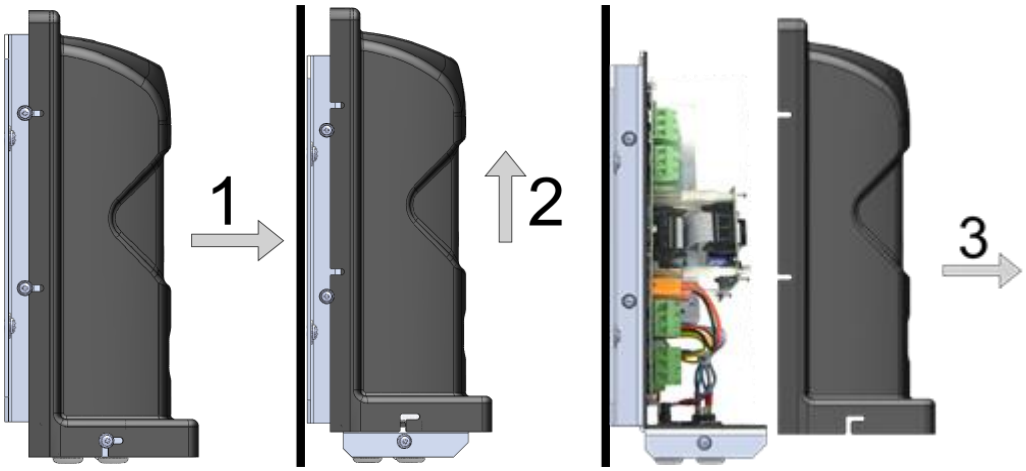


Figure 5

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5.4 Control box without protective cover

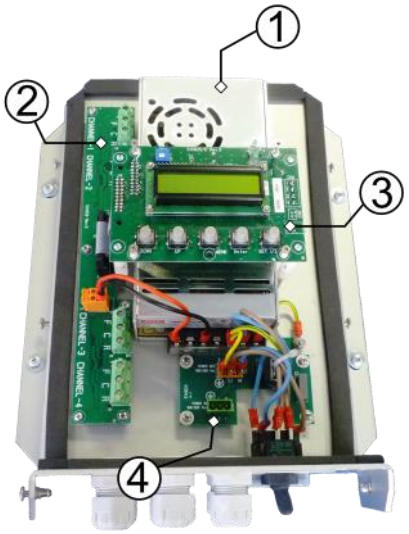


Figure 6

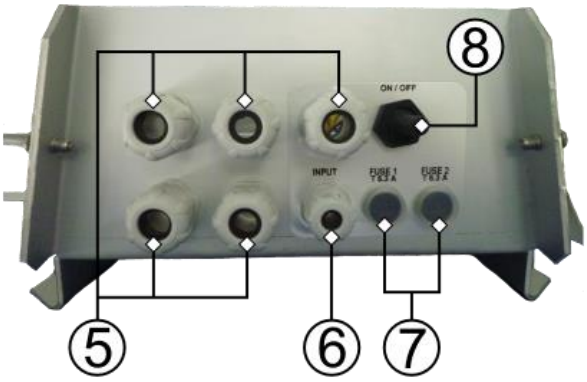


Figure 7

1- Switching current for pulsator channels

2- Pulsator control board

3- Control unit

4- Network entry board

5 - Cable glands for pulsator channels

6 - Cable gland for network channels

7 – Fuse holders

8 – Switch

ATTENTION

The upper board is fixed to spring supports which allow it to be correctly positioned in relation to the cover. The four springs inside the small nylon columns MUST NOT be removed.

ATTENTION

The small nylon columns are comprised of two parts which contain a spring. If due to a hard knock these parts become separated be careful not to lose either part.

ATTENTION

If the small nylon columns are accidentally dismantled to remount the upper board do as follows:

- **Check that there is a spring in each column.**
- **Put every part of the small column in place ensuring the guides match.**
- **Press the parts of the small columns which jut out from the upper board.**

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5.5 Electrical connections

5.5.1 Preliminary remark

To complete the connection of the control box power cable and of the cables which control the pulsators the cover of the control box must be removed.

ATTENTION: REMOVE POWER
Before removing the cover the power supply to the IUC48 must be removed.

5.5.2 Connection of control box power cable

Connect the cable from main power supply to the CN2 connector (3 poles) complying with the instructions contained in this manual.

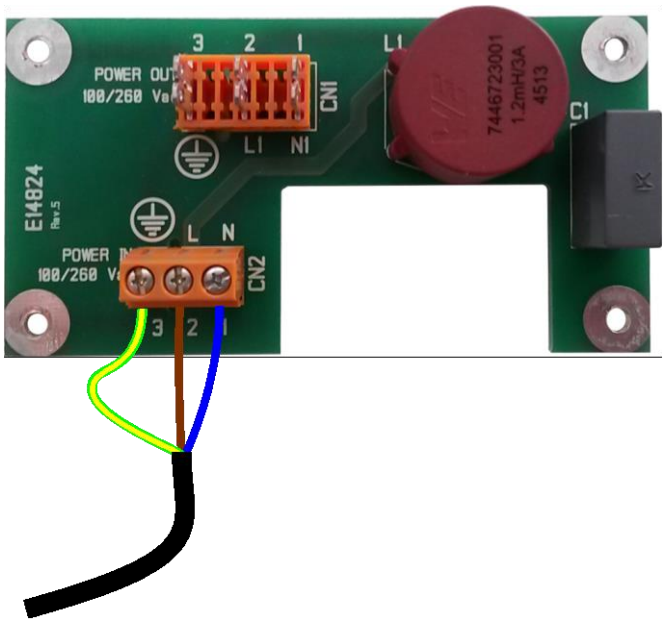


Figure 8

ATTENTION
Keep the earth cable (green-yellow) always longer than the others

ATTENTION
The equipment must be connected to the electrical network in-line with the laws in force: InterPuls does not guarantee the correct operation of the device if connected to networks with unstable voltage and frequency.

ATTENTION
Size the power cable in-line with the laws in force and the absorption as detailed on the IUC48 label.

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5.5.3 Connection of pulsator control cables

Connect the pulsator control cables to the respective terminals in groups of 12 pulsators per channel.

Connect the cables of the first 12 pulsators to terminal “Channel 1” respecting the F-C-R indications.

Connect the cables of the next 12 pulsators to terminal “Channel 2” and so on for “Channel 3” and “Channel 4”.

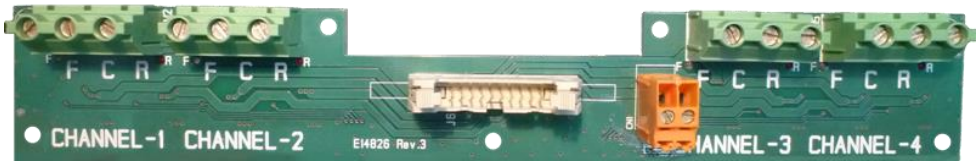


Figure 9

5.6 General connection diagram

5.6.1 General connection layout

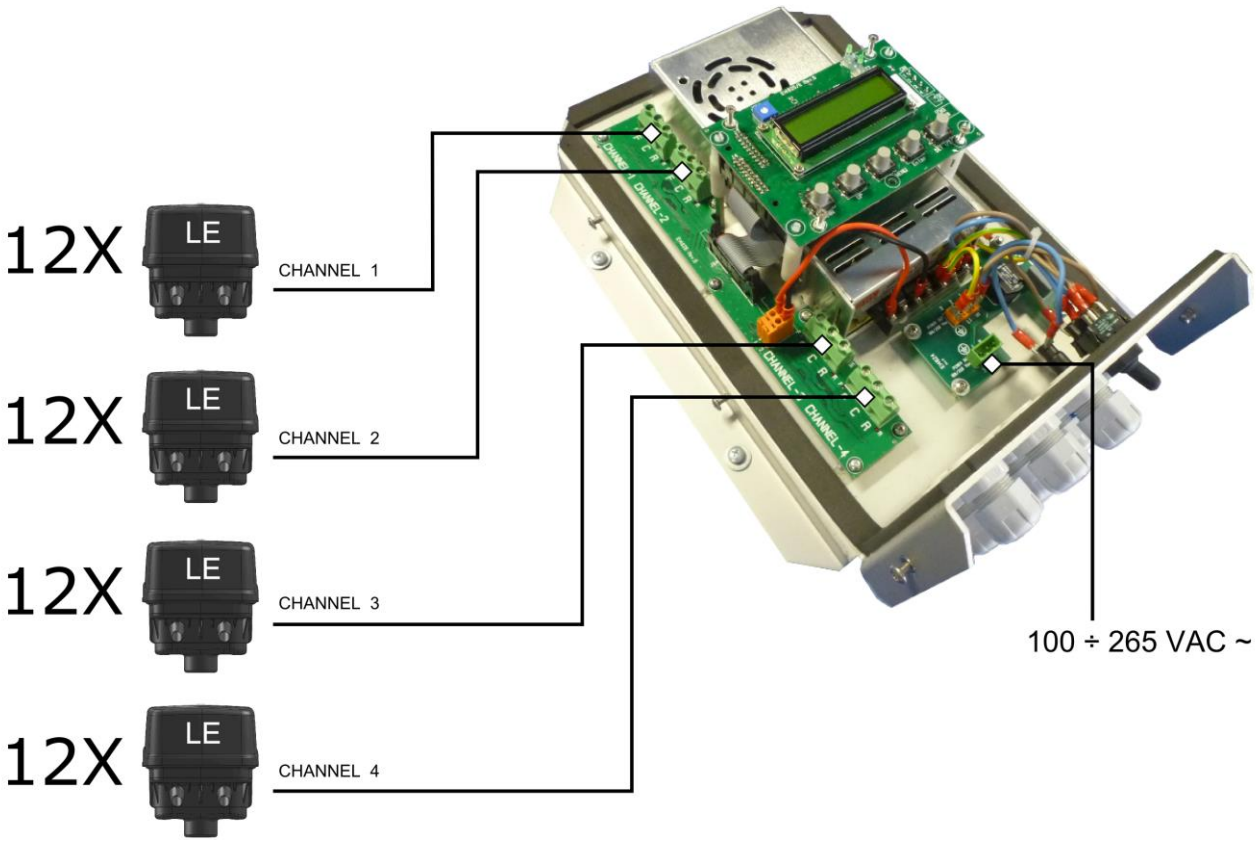


Figure 10

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5.7 Adjustment of screen contrast

To adjust the contrast of the screen, rotate the knob located on the display board:

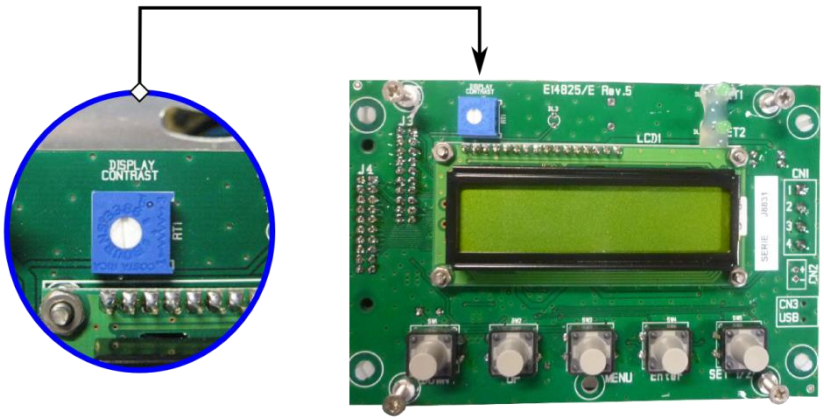


Figure 11

NOTE
The contrast of the screen has been set by the production house to provide optimum performance.
The contrast must be adjusted only when the control box is viewed from specific angles. Only touch the adjustment knob if the screen is not very legible.

ATTENTION
Carefully twist the contrast adjustment knobs.

5.8 Cover assembly

5.8.1 Cover assembly procedure

Ensure the screws are sufficiently distanced from the support to ensure the edge of the cover can slot through.

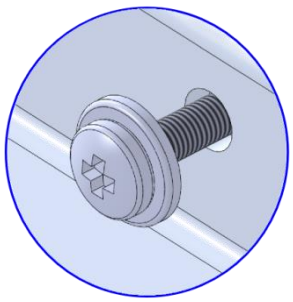


Figure 12

- Lay down the rear edge of the cover on the 4 screws positioned on the rear part of the support, taking care not to damage the components and the cables enclosed within the control box.
- Slide the cover on the rear screws until the screws fixed to the base slot in. Lightly push the cover so that the rear screws also slot in.

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– Whilst maintaining a light pressure on the cover tighten the 6 screws, ensuring the cover is securely fixed but without excessively tightening the screws.

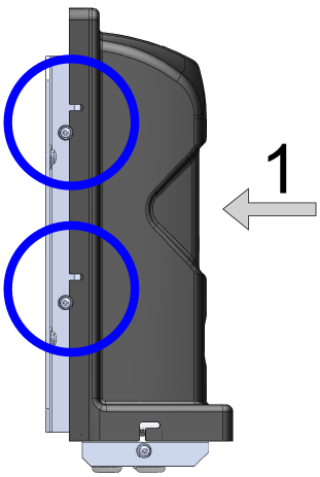


Figure 13

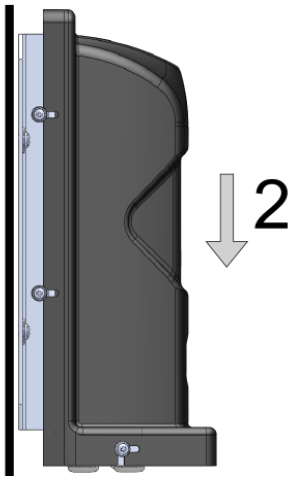


Figure 14

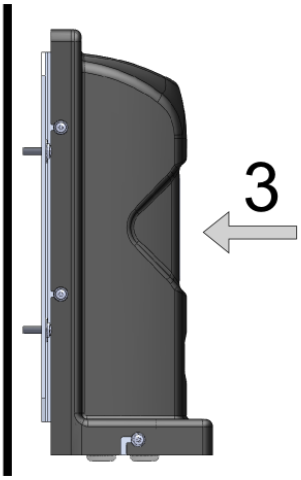


Figure 15

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6 IUC MENU FEATURES

6.1 Menu features

6.1.1 Preliminary remark

From the menu it is possible to change the pulsation parameters of the control box and other various operations described in this manual.

6.1.2 Procedure for accessing main menu

To access the control box main menu it is necessary to:

- Switch on the control box
- Wait for the equipment to display the channel functionality data indicating standby mode



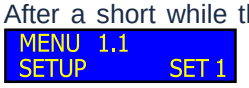
- Press the 

key and insert the password 1 3 2 

- Select the first number (1) using the  and  keys and press  to confirm
- Repeat the operation to insert the second number (3)
- Repeat the operation to insert the third number (2)

NOTE:
Settings left incomplete for more than 15 seconds will be cancelled.

- If the password inserted is correct the word “CORRECT” appears on screen for 3 seconds
- After a short while the first page of the main menu, MENU 1.1. SETUP SET1, appears on screen



- Pressing  allows you to move to next menu whilst pressing  allows you to access the page to adjust the SET1 parameters.

6.1.3 Menu structure

MENU’	FEATURE
MENU 1.1 SETUP SET 1	SETUP parameters of SET1
MENU 1.2 SETUP SET 2	SETUP parameters of SET2
MENU 1.3 TIMER	View/set the counter operating hours **(password protected)**
MENU 1.4 VOLTAGE	View the voltage of the pulsators
MENU 1.5 CURRENT	View the current absorbed by the pulsators divided by channel
MENU 1.6 VER SOFTWARE	Displays software version
MENU 1.7 DEFAULT	Reset SET1 and SET2 default parameters **(password protected)**
MENU 1.8 LANGUAGE	Language selection
MENU 1.9 START DELAY	Delay of start of pulsation

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6.2 Menu 1.1 & Menu 1.2 - Setup Pulsation Parameters SET1 and SET2

6.2.1 Setup Pulsation Frequency (FREQ.)

6.2.1.1 Parameter adjustment procedure

- Enter Menu 1.1 SETUP SET1
- Scroll the parameters until the FREQ page is displayed 

- Press  to adjust the pulsation frequency specified in ppm (pulsations per minute)
- An arrow will appear on screen to highlight that the data is in adjustment mode 

- Press  or  to adjust the value and press  to confirm. The arrow indicating adjustment mode will disappear



NOTE:
The setting is the same for all 4 channels.

– Press  to move to the next screen to adjust the Front Ratio **(RATIOF)**

6.2.2 Front Ratio Setup (RATIOF)

6.2.2.1 Parameter adjustment procedure

- Enter Menu 1.1 SETUP SET1, scroll the parameters until the RATIO F page is displayed 

- Press  to adjust the Front Ratio. An arrow will appear on screen to highlight that the data is in adjustment mode 

- Press  or  to adjust the value and press  to confirm. The arrow indicating adjustment mode will disappear



NOTE:
The setting is the same for all 4 channels.



NOTE:
When the RATIO F value is set the same value is automatically set for the RATIO R parameter so that both values are identical. In the instance different values for RATIO F and RATIO R are required, set the desired RATIO F value first and subsequently the RATIO R value as explained hereafter.

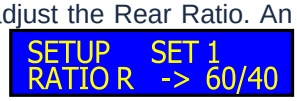
– Press  to move to the next screen to adjust the Rear Ratio.

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6.2.3 Rear Ratio Setup (RATIOR)

6.2.3.1 Parameter adjustment procedure

- Once in Menu 1.1 SETUP SET1, scroll the parameters until the RATIOR page is displayed 

- Press  to adjust the Rear Ratio. An arrow will appear on screen to highlight that the data is in adjustment mode 

- Press  or  to set a RATIO R value different to the one set for RATIO F
- Once the value is set press  to confirm. The arrow indicating adjustment mode will disappear

NOTE:
In the instance you want to set the same value for RATIO F and RATIO R only adjust the RATIO F option.

Press  to move to the next screen to adjust the Phase (**PHASE**)

6.2.4 Phase Setup (PHASE)

6.2.4.1 Preliminary remark

By adjusting the PHASE parameter it is possible to set a phase displacement between the pulsation phases of the various groups of the system.

This phase displacement ensures fewer vacuum fluctuations in the milking system.

NOTE:
Defined as “T” the time of a complete pulsation cycle expressed in milliseconds, the phase displacement “delay” between the wave forms of the four IUC48 channels is equal to the value indicated on screen.

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60/40 ratio, cycle duration 1000Ms

The diagram represents a T/2 setting (500Ms delay between each channel)

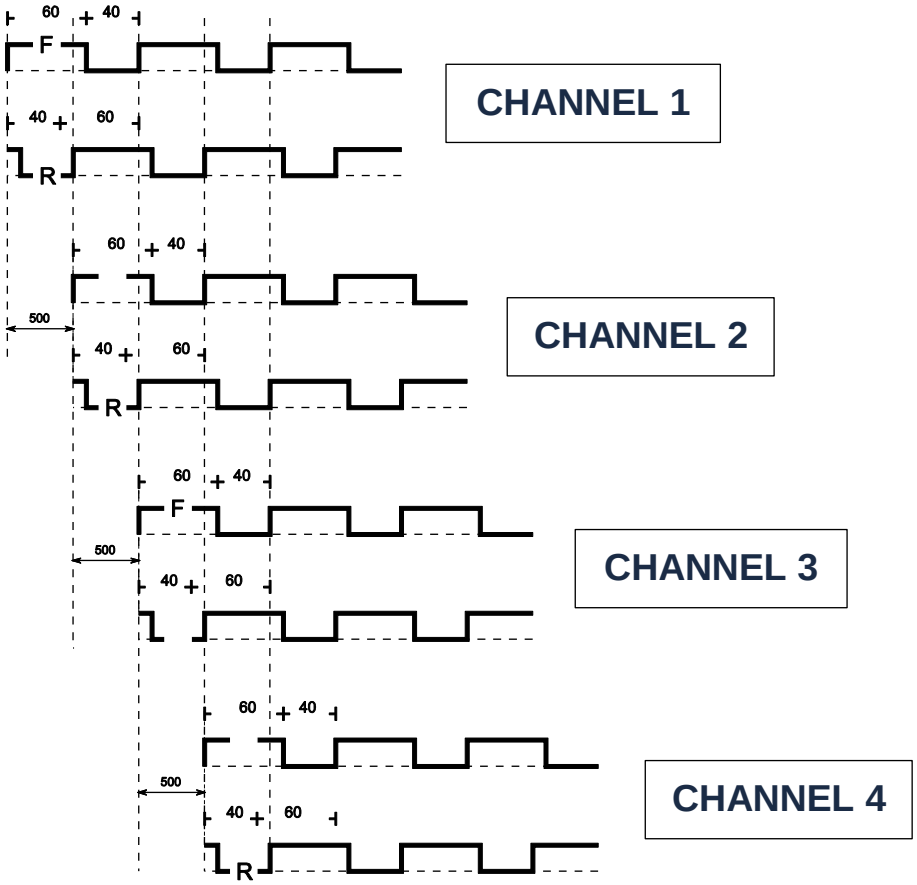
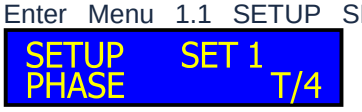


Figure 16

[CHANNEL 1 / CHANNEL 2 / CHANNEL 3 / CHANNEL 4]

6.2.4.2 Phase setup procedure

- Enter Menu 1.1 SETUP SET1, scroll the parameters until the PHASE page is displayed



- Press  to adjust the phase value. Each time the  key is pressed the set value moves to the following one (T,T/2,…,T/7,T/8).

- Press  to move to the next screen to activate the reverse (**REVERSE**).

6.2.5 Reverse Setup (REVERSE)

6.2.5.1 Preliminary remark

This feature activates the reversal of the ON and OFF timings of the pulsator coils.



NOTE
If a 60/40 ratio is set in the RATIOF menu and if the REVERSE function is set to ON, an output ratio of 40/60 is obtained.

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6.2.5.2 Setting reverse procedure

- Enter the Menu 1.1 SETUP SET1, scroll the parameters until the REVERSE 

page is displayed
- Press  to switch the reverse parameter from OFF to ON.

NOTE:
The control unit normally operates with the REVERSE parameter set at OFF.

NOTE:
The REVERSE ON condition is highlighted by the appearance of the letter "R" on the first line of the display, in the top right hand corner (last character) 

Pulsator power supply diagram in Normal condition (REVERSE OFF)

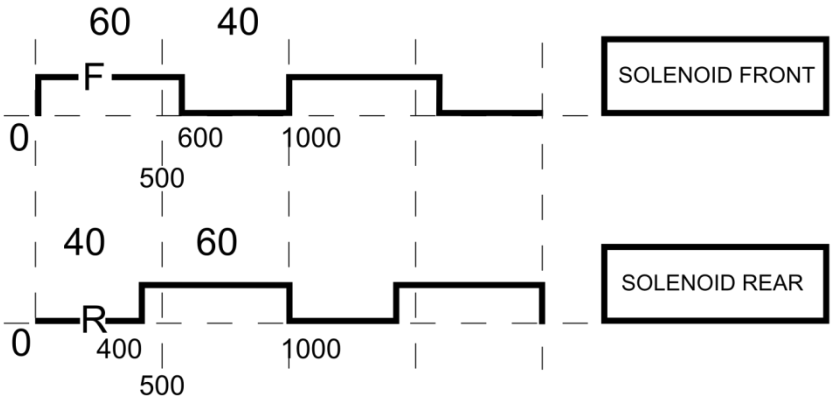


Figure 17

Pulsator power supply diagram in Reverse condition (REVERSE ON)

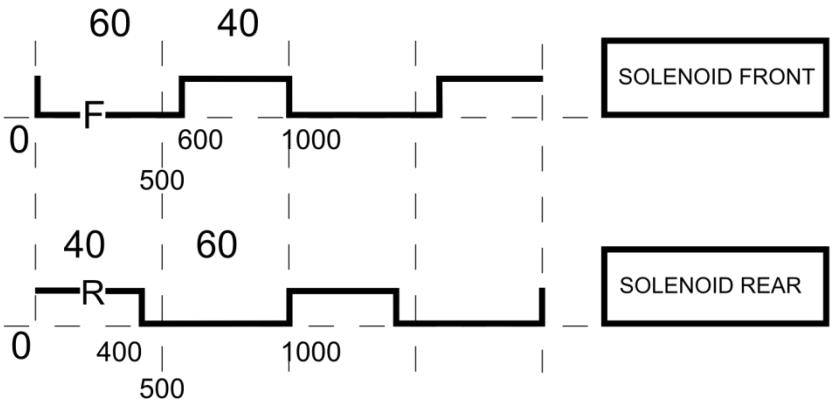


Figure 18

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6.2.6 Menu 1.3 - Operating Hours Counter

6.2.6.1 Preliminary remark

The IUC48 control box can count and log the operating house of the device.

It is possible to set a time after which a message 

is displayed, along with an intermittent alarm signal to inform the operator that the maintenance staff must be contacted to carry out the periodic check.

6.2.6.2 Counter setup procedure

- Select the MENU 1.3 TIMER page from the main menu
- Press  to access the parameters of this menu and insert the technical assistance password
- If the password inserted is correct “VALID” appears on screen for 3 seconds and the first submenu appears

NOTE:
Settings left incomplete for more than 15 seconds will be cancelled.

NOTE:
The IUC48 control box is protected by 2 passwords. The first password, 1 3 2, provides access to the main menu from which it is possible to adjust the pulsator parameters. The second password allows operations, reserved to expert staff, to be carried out.

6.2.7 Viewing Running Hours

6.2.7.1 Preliminary remark

The hours since the last reset are indicated in the upper part of the screen 

6.2.7.2 Zeroing hours procedure

To reset the running hours counter do as follows:

- Press the  key
- Confirm the operation pressing the  key again
- The screen will display a message confirming the operation is complete 

- Press the  key to move to the next submenu

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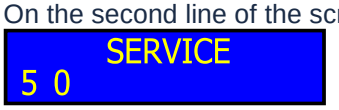
6.2.8 Next maintenance setup

6.2.8.1 Preliminary remark

The screen displays the number of hours currently set between the reset (**see** *6.2.7 - Viewing Running Hours*) and the next periodic check alert 

6.2.8.2 Adjustment of set value procedure

- Press the  key. On the second line of the screen the first number of the hours currently set appears (thousands). 

- Press  or  to select a different value and the  key to confirm
- On the second line of the screen the second number of the hours currently set (hundreds) will appear 

- Press  or  to select a different value and the  key to confirm
- On the second line of the screen the third number of the hours currently set (tens) will appear 

- Press  or  to select a different value and the  key to confirm
- On the second line of the screen the fourth and final number of the hours currently set will appear 

- Press  or  to select a different value and the  key to confirm
- The screen now indicates the new number of hours set before the next periodic check alert 



NOTE:
Settings left incomplete for more than 15 seconds are cancelled.



NOTE:
The default value is 5000 hours.



NOTE:
The maximum number of hours selectable is 9999.

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6.2.9 Menu 1.4 – Pulsators Current Voltage

6.2.9.1 Preliminary remark

The IUC48 control unit allows the current voltage supplied to the pulsators to be viewed.

6.2.9.2 View procedure

- Select the MENU 1.4 VOLTAGE page from the main menu
- On the second line of the screen the voltage value currently delivered to the pulsator is displayed

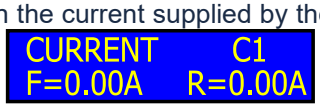


6.2.10 Menu 1.5 – Current Supplied

6.2.10.1 Preliminary remark

The IUC48 control box allows the current supplied to the pulsators to be viewed.

6.2.10.2 Viewing procedure

- Select the MENU 1.5 CURRENT page from the main menu and press  to enter
- On screen the current supplied by the Front and Rear terminal of the control box's channel C1 will be displayed 

- The first line specifies the channel to which the data displayed refers to
- On the second line of the screen the value of current supplied by the C1 Front terminal to the left and by the C1 Rear terminal to the right will be displayed
- Wait 10 seconds to view the data relating to channels C2, C3 and C4 in sequence, otherwise select the channel you wish to view by pressing the  and  keys

NOTE:
Current less than 40mA appear as absent load and the screen display indicates 0.00A.

NOTE:
Indication of an absorbed current equal to 0.4A on a powerless channel is normal and is due to the test current (non-influential on the correct functioning of the control box).

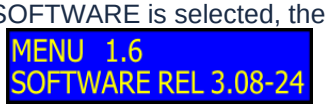
NOTE:
The maximum current deliverable by every Front/Rear connector before the circuit breaks is 3A.

NOTE:
The intermittent "SHORT CIRCUIT" alert appears on screen when there is a surcharge on one channel of the control box; it is interrupted when on the "MENU 1.5 CURRENT" page. The control box nevertheless limits the current and this alert reappears upon exiting the menu.

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6.2.11 Menu 1.6 – Software Version

6.2.11.1 Viewing procedure

When the Main Menu page entitled MENU 1.6 VER SOFTWARE is selected, the second line of the display will show the software version installed in the device. 

6.2.12 Menu 1.7 – Resetting Default Values

6.2.12.1 Preliminary remark

It is possible to reset all the SET1 and SET2 parameters to their default values.

6.2.12.2 Default value resetting procedure

- Select the Main Menu page entitled MENU 1.7 DEFAULT
- Press  to access the parameters of this menu and enter the password for technical support.



NOTE:
If the settings are left incomplete for more than 15 seconds the function in course will be cancelled.



NOTE:
The IUC48 control unit is protected by 2 passwords. The first password 1 3 2 is the one that enables access to the Main Menu from which the pulsation parameters can be edited. The second password allows operations reserved to specialised personnel to be carried out.

- If the password entered is correct, within 3 seconds the word “VALID” will appear, followed by the message 

- At the end of the resetting process, the control unit repositions itself on the Main Menu page entitled MENU 1.7 DEFAULT.

6.2.13 Menu 1.8 – Setting the Language

6.2.13.1 Preliminary remark

The following languages can set: ITALIAN - ENGLISH - GERMAN - FRENCH - SPANISH

6.2.13.2 Language setting procedure

- Select the Main Menu page entitled MENU 1.8 LANGUAGE 

- Press  to access.
- Press  or  to select the desired language
- Press  to confirm.



NOTE:
Once the desired language has been selected, the control unit returns to the Main Menu page entitled MENU 1.8 and all the pages of the menu are now displayed in the chosen language.

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6.2.14 Menu 1.9 – Start of pulsation delay

6.2.14.1 Preliminary remark

The following values can set: OFF – 5 sec. – 10 sec. – 15 sec. – 20 sec. – 25 sec.

6.2.14.2 Pulsation delay setting procedure

- Select the Main Menu page entitled MENU 1.9 START DELAY



- Press  to access.
- Press  or  to select the desired value
- Press  to confirm.

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7 MAP OF THE MENUS

GENERAL TREEVIEW

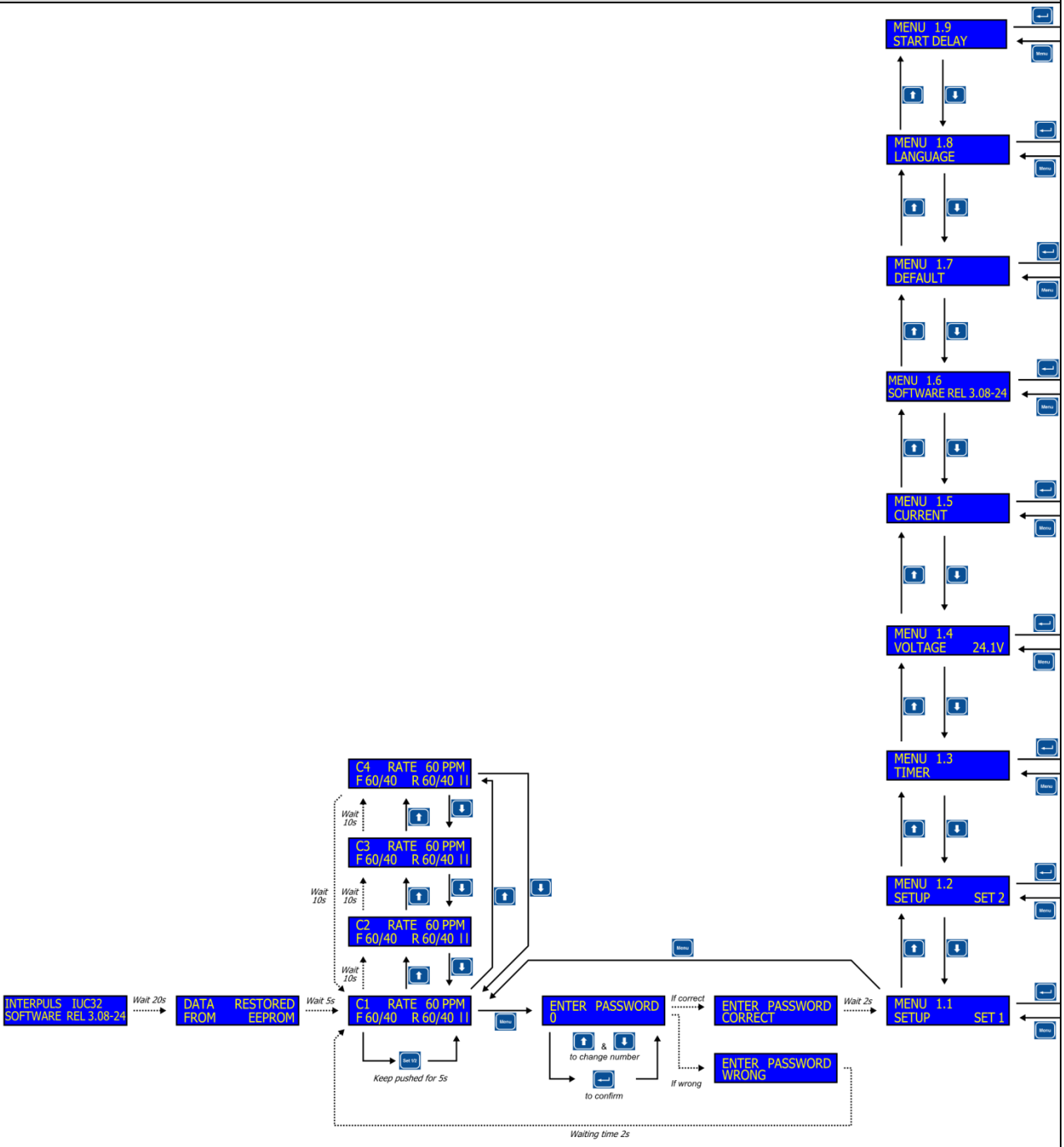


Figure 19

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Menu 1.1 SET 1

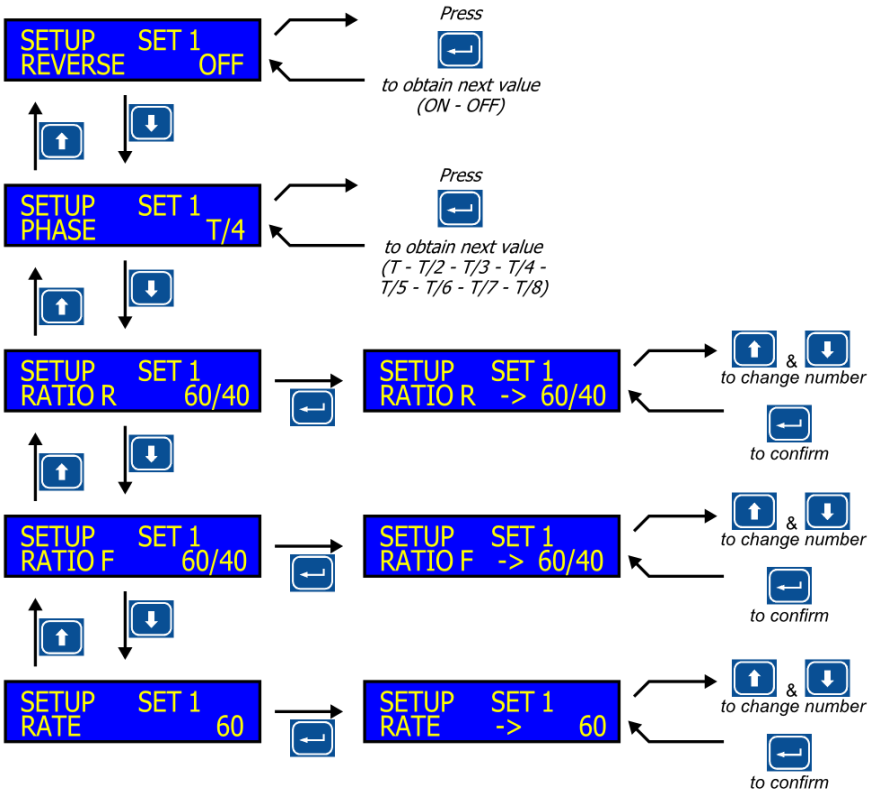


Figure 20

Menu 1.2 SET 2

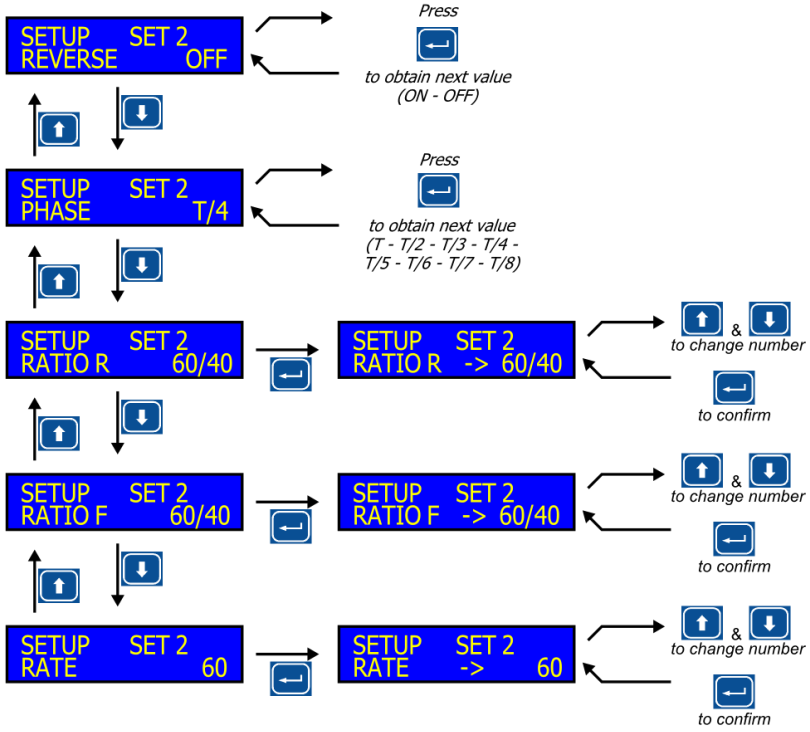


Figure 21

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Menu 1.3 TIMER

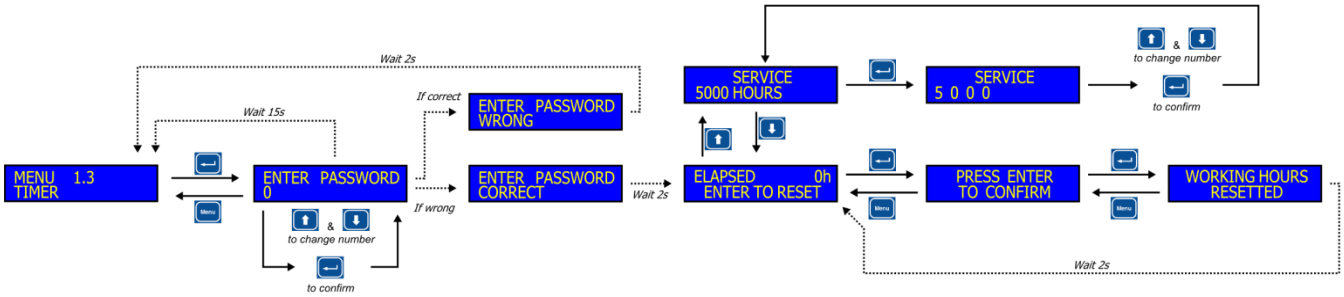


Figure 22

Menu 1.5 CURRENT

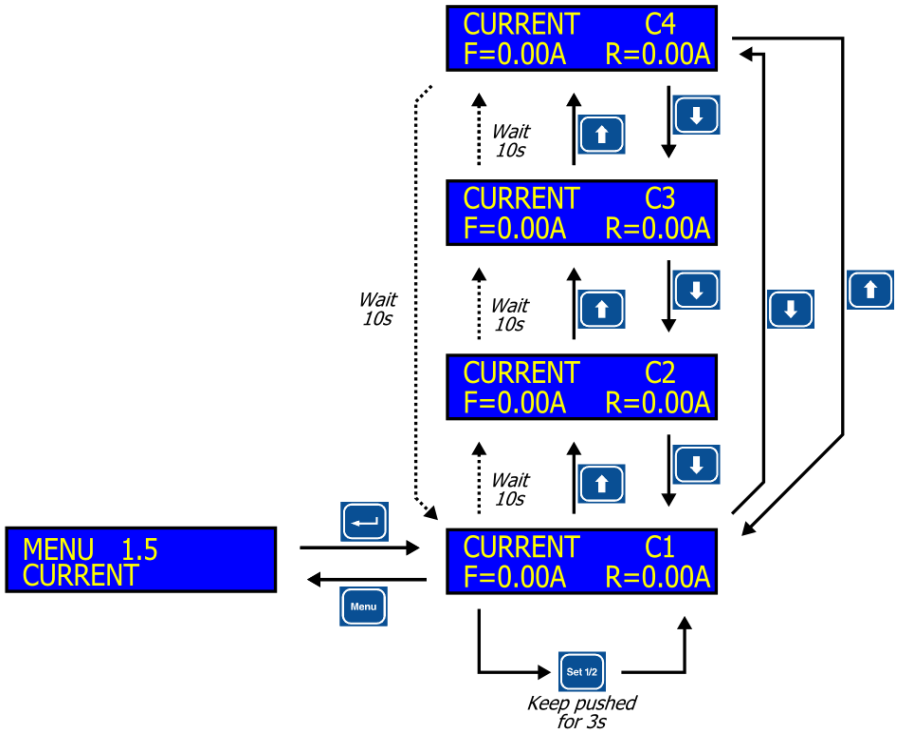


Figure 23

Menu 1.7 DEFAULT

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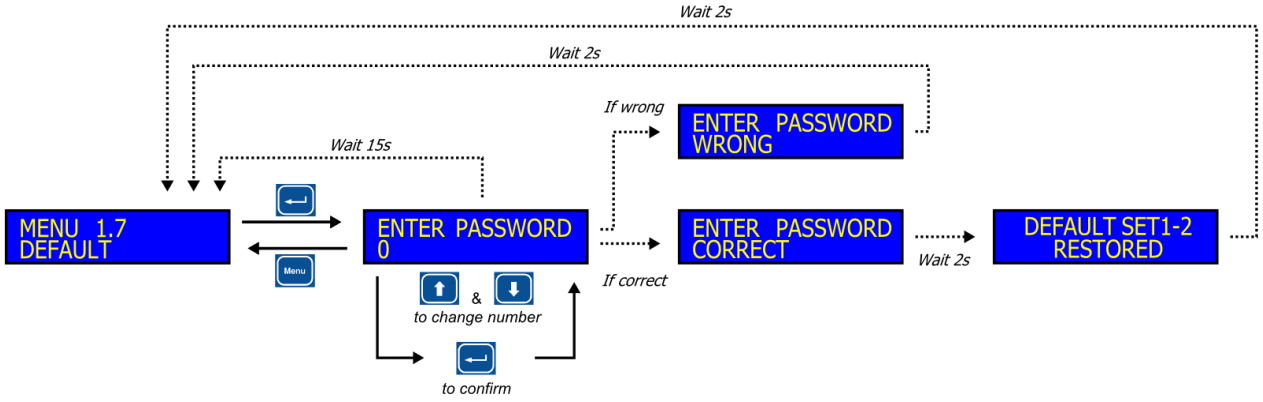


Figure 24

Menu 1.8 LANGUAGE

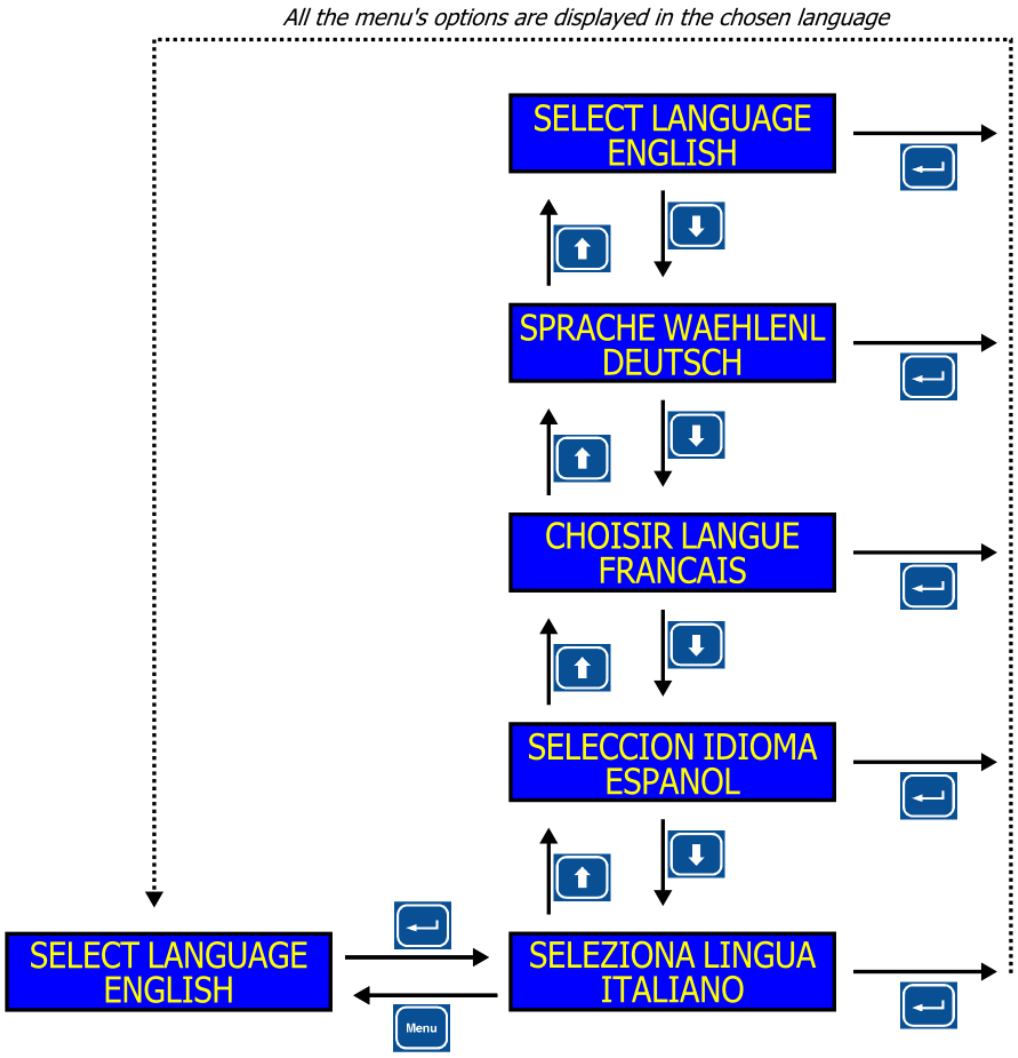


Figure 25

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Menu 1.9 START DELAY

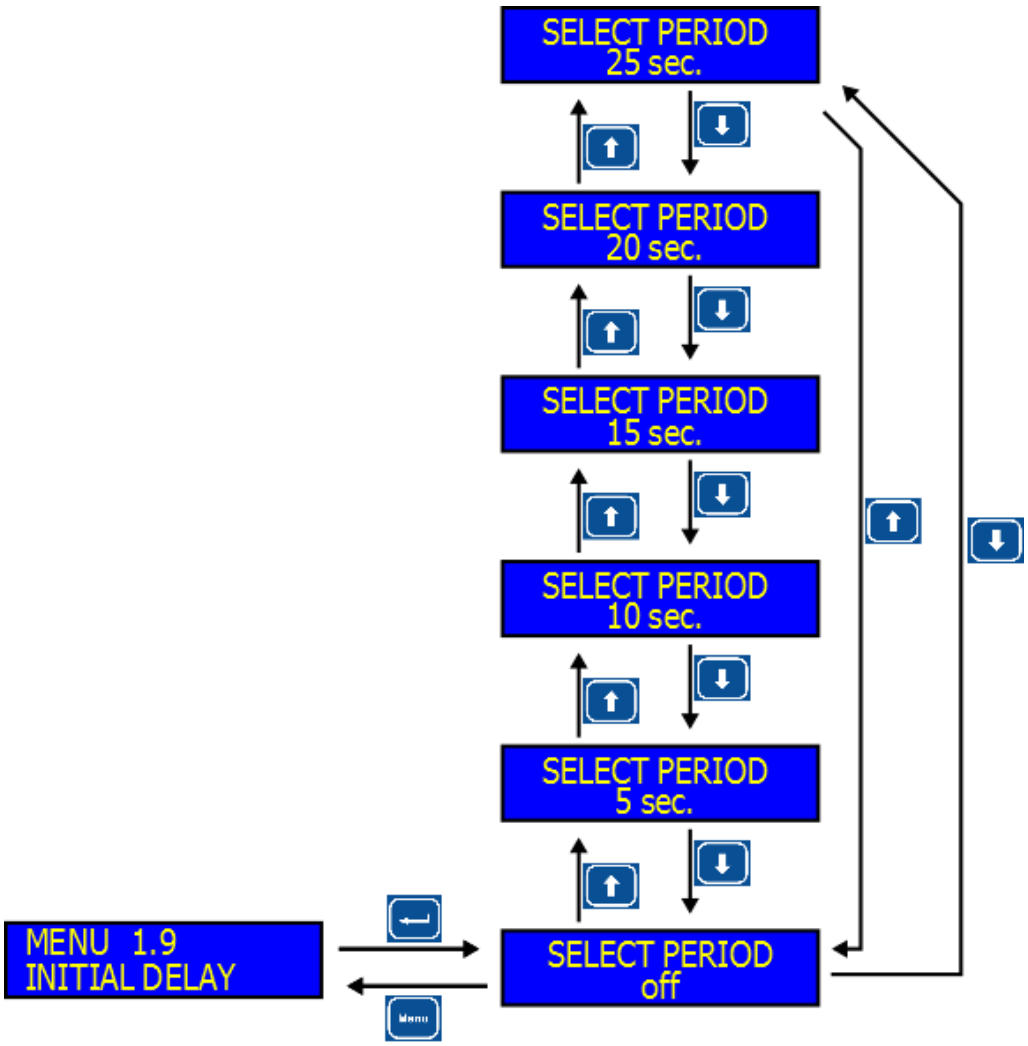


Figure 26

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8 SWITCHING ON FOR THE FIRST TIME

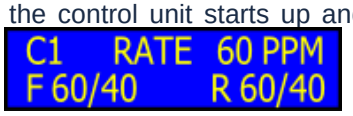
8.1 First time procedure

WARNING
Before switching on, ensure that all the connections have been correctly installed as indicated in the paragraph *5 - CONNECTION AND INSTALLATION*

- Switch the device on by turning the main switch on the control unit to the ON position.

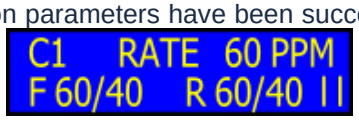


Figure 27

- Wait until the control unit starts up and enters its normal operation cycle. The following data are displayed 

- Press the 

button and enter the password 1 3 2.
- Set the pulsation parameters as explained in paragraph *6.2 - Menu 1.1 & Menu 1.2 - Setup Pulsation Parameters SET1 and SET2*
- Once the pulsation parameters have been successfully set, press the 

button until the stand-by screen returns 

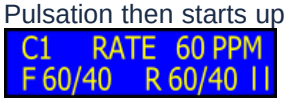
- All the settings programmed are stored, even when the power supply is cut off.

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9 SWITCHING ON AFTER THE FIRST TIME

9.1 Switching on after the first time

- Turn the switch on.
- The control unit shows the software version stored in the memory.
- The currently set pulsation parameters are loaded. This time prior to the starting of the pulsators allows optimum vacuum to be obtained in the system before the pulsators start up.
- The message 

indicates that the control unit has loaded the set parameters correctly and that it will start up with the last set of parameters selected.
- Pulsation then starts up after the initial delay set in menu 1.9 and the following message is displayed 

- The alternating flashing of the two bars in the bottom right hand corner of the display indicates that the microprocessor is controlling the power transistor of the pulsators correctly.
- The message is displayed for 10 seconds on each channel and is repeated cyclically
- By pressing the  or  button, it is possible to display the information relative to a specific channel, without having to wait for the automatic scrolling.
- In order to switch from the settings stored for SET1 to those stored for SET2, hold down the 

button for at least 3 seconds.

NOTE:
It is possible to switch from SET1 to SET2 both during the normal operation of the control unit and also from the programming menu.

- The SET1 and SET2 LEDs indicate which of the two sets of parameters is currently active.

NOTE:
If the set is switched during the normal operation of the control unit, the display is immediately updated with the new pulsation parameters.

NOTE:
When the control unit is switched on, the device starts operating with the last SET of parameters selected prior to being switched off and it stores all the data programmed before it was switched off.

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10 TROUBLESHOOTING AND ALERTS

10.1 No command to pulsators

Problem Encountered
No command to the pulsators; no pulsation on some of the pulsator channels
Checks to be performed
During the Stand-by condition, failure of one of the two flashing bars indicates a pulsator channel power failure. 
Solutions
Contact Service immediately. A part of the system may not be receiving the pulsation command.

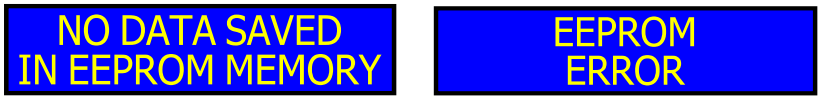
10.2 Excessive current

Problem Encountered
There isn't the pulsation in some pulsators channels
Checks to be performed
During operation, the normal Stand-by screen alternates with another indicating "SHORT CIRCUIT". This happens when the current of a single section (F or R) of a channel exceeds the limit of 3A. The second line of the display shows which section of which channel is in overload condition (e.g.: F1=Front Channel 1, R4=Rear Channel 4). This channel is isolated from the load, i.e. it is no longer powered while all the other sections continue to work normally.  Channel 1 F in overload or short circuit condition. If several overload/short circuit conditions occur at the same time, the control unit reacts by interrupting the pulsation command only on the channels affected by the problem and a message is displayed indicating which channels are affected by the failure.  Channels 1, 3, 4 coil R in overload or short circuit condition. The control unit automatically eliminates the pulsation command in the faulty part of the system only. If the damage is temporary, the situation returns to normal and the message disappears; otherwise, the channel remains disabled until the control unit is switched off and then switched on again.

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Solutions
Contact Service without delay. Do not use the channels affected by the problem for milking. There might be a problem in the electrical connections between the pulsators and the control unit. **NOTE:** **The excess load condition can be maintained indefinitely without damage because the power transistors that feed the pulsators are protected against permanent short circuit.** **NOTE:** **The control unit verifies the short circuit or overload condition by attempting to restore the power supply to the pulsators 3 times at 6-second intervals. If, after the third attempt, the failure persists, the power supply is cut off until the control unit has been switched off and then switched on again.** **NOTE:** **The SHORT CIRCUIT message is associated with an intermittent buzzer.** **NOTE:** **In the event of multiple alarms, the message SHORT CIRCUIT alternates with the reporting of the other currently active alarms (WARNING LOW VOLTAGE and/or OPERATING HOURS TECHNICAL SUPPORT)**

10.3 Memory error

Problem Encountered
The control unit is not operating correctly and one of the following messages is displayed: 
Checks to be performed
Switch off the control unit and wait for 30 seconds before switching it on again. Check whether the error message is still displayed.
Solutions
Contact Service without delay. The message indicates the existence of errors in the memory of the control unit. These errors cancel the settings saved and delete the service hours stored by the machine.

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10.4 Service control time exceeded

Problem Encountered
The control unit displays the following message: SERVICE TIME OVERDUE The message displayed is associated with an intermittent buzzer (0.5sec ON - 2sec OFF)
Checks to be performed
Ensure that, after 10 seconds, the display starts showing the operating parameters again.
Solutions
Contact Service immediately. When the operating time of the control unit exceeds the number of hours set for the next periodical check (default=5000 hours), each time the control unit is switched on a message will appear for 10 seconds reminding the operator to call Service for the periodical check of the equipment. **NOTE:** **Only Service can cancel the alarm message by entering – by means of the appropriate password – the Menu 1.3 Timer**

10.5 Low pulsator command voltage

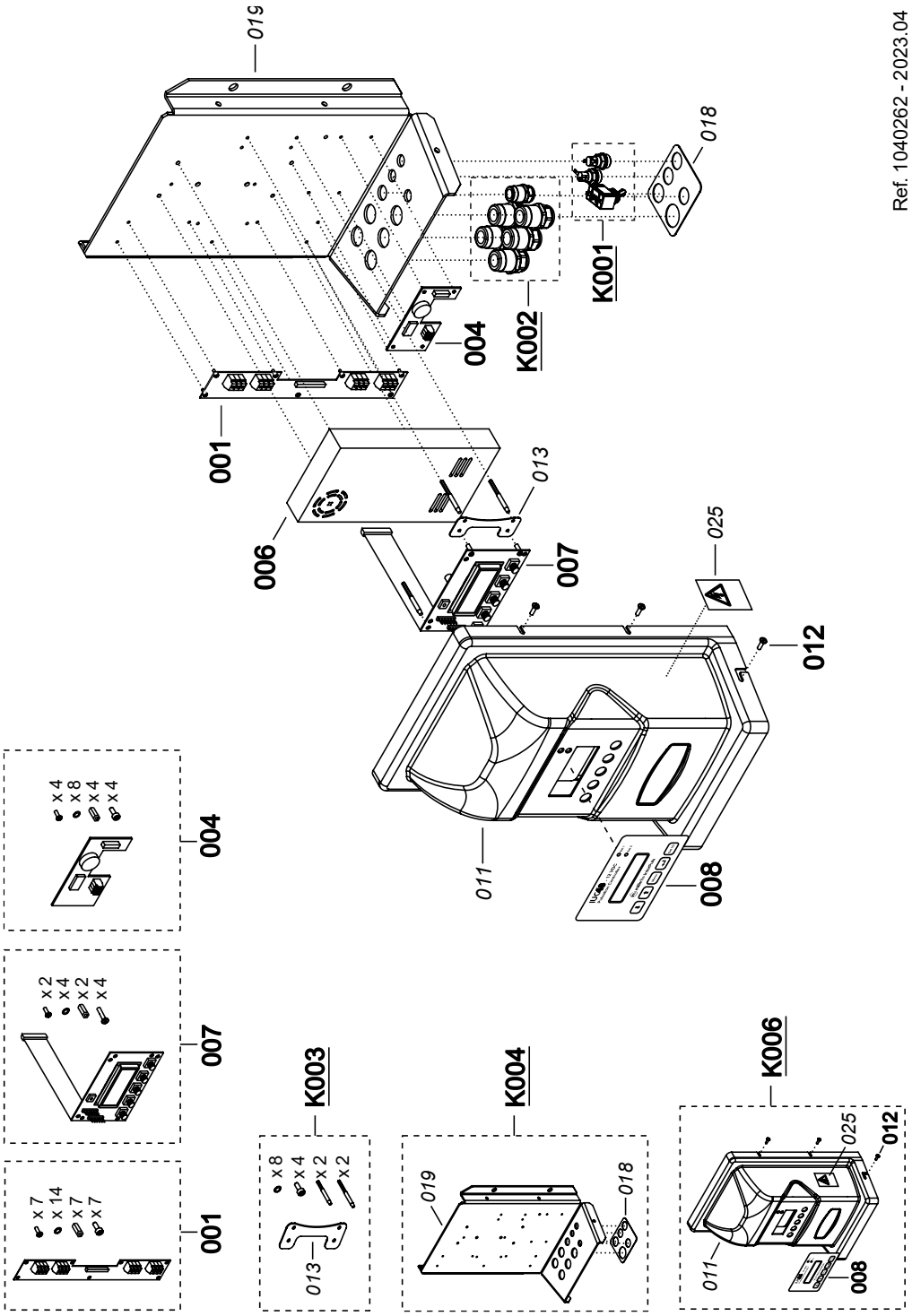
Problem Encountered
The control unit displays the following message: WARNING LOW VOLTAGE This message alternates on the display with the normal message indicating that pulsator control is in operation (2sec ON - 10sec OFF)
Solutions
Contact Service immediately. The output voltage of the power supply unit requires adjustment. The microprocessor control works well even with very low voltages but some pulsators might NOT work properly with command voltages that are too low. An alarm signal sounds when the supply voltage of the pulsator drops below 21V.

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11 MAINTENANCE

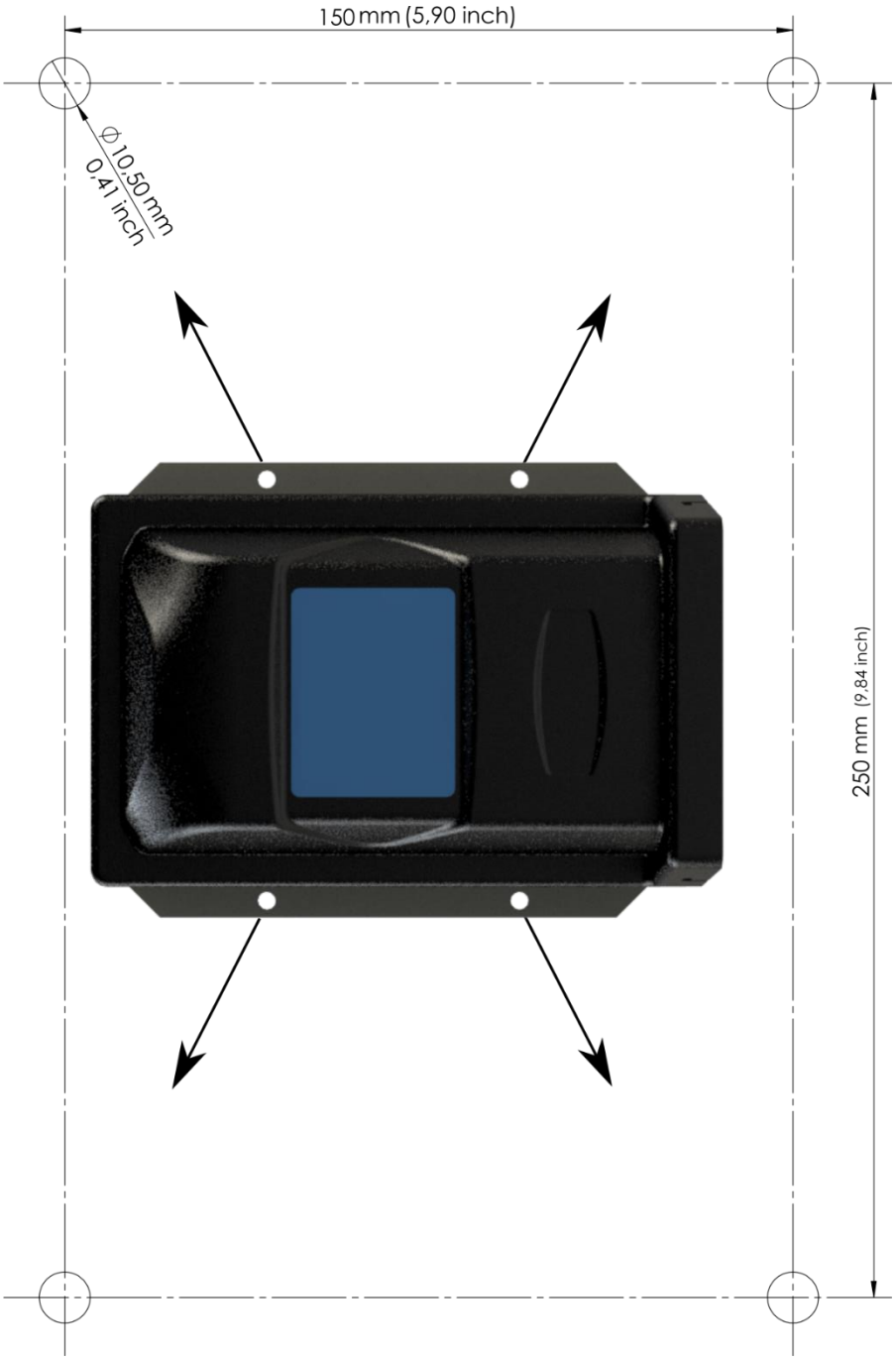
A specialised technician’s visit is recommended for maintenance every 12 months in order to check the state of wear of the electrical and mechanical components of the Programming system.

12 SPARE PARTS DIAGRAM



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13 DRILLING TEMPLATE



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