PROCIONIX - EL6 INVERTER

MULTIPROGRAM PROGRAMMABLE CONTROLLER

PROGRAMMING MANUAL

For EL68_0_6 software

November 1996 Edition
Version 1.0 containing 55 pages

FIBER

CSQ
ISO 9001

CONTENTS

CHAPTER 1

TECHNICAL SPECIFICATION

Power supply   : 230V ac, other voltages on request.

Contacts   : 5A 250V ac cos φ 1
      1A 220V ac cos φ 0.4
      5A 24V dc resistive load

Number of outputs   : Two standard versions:

      1) 16 relays
      2) 24 relays

      The relays can be configured in groups of 4: each group has the same common.

Output relay function   : See usage diagram - Chapter 8, page 51.

Number of inputs   : Standard version No. 6 of which No. 4 are digital and No. 2 are analog handled as follows:

      No. 1 - micro door (digital)
      No. 2 - micro unbalance (digital)
      No. 3 - thermal overload of motors (digital)
      No. 4 - remote door opening (digital)
      No. 5 - water temperature probe (analog)
      No. 6 - water level (analog)

      possibility of maximum expansion up to:

      No. 8 digital
      No. 2 analog
      No. 1 digital counting frequency 10 KHz

Dimensions   : Front panel with keyboard: 180 x 130 x 65 mm
      Power supply board version 16 outputs: 189 x 134 x 39 mm
      24 outputs version: 273 x 134 x 39 mm

Connections   : faston 6.35 quick-release terminal block.

Programming   : From keyboard on-board machine.

Copying   : Possibility of transferring programs to "Memory Card" for easy pre- and post-sales program handling.

| Memory capacity | : | **1)** N° 5 Cycles: Prewash - Wash - Rinse - Spin - Unroll. Possibility of numbering each cycle from 1 to 99. |

| | | **2)** N° 30 complete programs consisting of a maximum of No. 15 cycles (Prewash - Wash - Rinse - Spin- Unroll) that can be configured freely. |

| | | **3)** N° 400 total steps that can be freely distributed in cycles. |

Temperature handling : Possibility of setting the temperature in degrees Centigrade and displaying it either in degrees Centigrade or in degrees Fahrenheit with resolution of 1° C; setting from +30°C to +93°C.

Level handling : Possibility of setting and displaying the levels in cm with resolution of 1 cm - setting from 0 to 100 cm.

Washing motor handling : Possibility of creating No. 15 subcycles relative to the sequence of times of: forward rotation, pause, backward rotation. Resolution of 1 s - maximum setting 240 s.

Sensors self-test : In the event of faults in the functioning of temperature or level sensors, or concerning circuits, visual and acoustic signalling (if provided).

Message display : Possibility of selecting No. 5 languages: Italian - English - German - Spanish - French.

Power Failure : Protected against micro interruptions on the line
In the event of interruption of power supply the current situation is stored. When the power supply is restored, the operator can select whether to start from the beginning of the cycle or to abort the program. NOT ACTIVE during the execution of a single cycle.

Door opening : Opening of the door is inhibited during execution of the programs. At the end of execution of a program, opening of the door is conditioned by a time periodo entered with password 219 (default value: 40s), by the temperature inside the drum which must be lower than 40° C, and by the water level, which must be less than 3 cm.

Inverter Output Voltage : 0-10 V output proportional to the required number of r.p.m. of the drum (resolution of 12 bits).

Max rpm of the drum : the maximum number of drum revolution can be preset with the password 207. The limit is 999 rpm equal to 10 V output

Max rpm allowed : the maximum number of rpm that can be predetermined in each step is as follow:

- PreWash = 100 rpm
- Wash = 100 rpm
- Rinse = 100 rpm
- UnRoll = 100 rpm
- Spin = 999 rpm

NB - The number of rpm can not exceed the maximum number preset with the 207 password.
  - In the Spin cycle the range between 150 and 250 rpm can not be programmed (resonance).

CHAPTER 2

FRONT PANEL

DESCRIPTION OF KEYS

INS
1

.

Number key, used for all settings

Enables a new step to be inserted in an existing cycle, during the programming phase. In the execution phase allows to check the programmed number of drum rpm of the motor in the current step.

DEC
2

Number key, used for all settings.

Allow the program or a cycle to run forward or backwards during the editing phase.

INC
3

If pressed simultaneously with the TEMP or LEVEL keys, allow temporary modification of the temperature or level value set.

Allow a time in minutes to be increased or decreased while a step is being executed.

TEMP
4

Number key, used for all settings.

If pressed during the heating phase, when the display shows the real temperature of the actual tub, allows the set value and any momentary modification to be read by means of the INC and DEC keys.

In all other phases, it allows the current value of the tub temperature to be read.

5
LEVEL

Number key, used for all settings.

If pressed during the tub filling phase when the display shows the current level, allows the set value and any temporary modification of the temperature to be read, by means of the INC and DEC keys.

In all other phases, it allows the current value of the tub level to be read.

TIME
6

Number key, used for all settings.

If pressed during the phases of filling, draining or heating, if the cause of the end step is a level, or a temperature, allows the WDT to be displayed during the phase under way.

(WDT = WATCH DOG TIMER).

7	
8	Number keys, used for all settings.
9	

0	Number key, used for all settings.
PAUSE	If pressed during the execution of a program, it disables all the output relays, keeping only the drain relay state unchanged. Not active during distribution and spin cycle.

UNLOCK DOOR	Controls the door unlock electromagnet. Is only active if the program is not in execution.

ADVAN	During execution of a spin, with the slow or fast spin motor inserted, it aborts the spin cycle automatically, bringing about a pause in the slowing down of the motors. During execution of a program, it terminates the current step, and starts up the next step. During selection of the program, before pressing START, allows the program to be started not right at the beginning but from any intermediate cycle.In editing cycles, allows a skip to be made to the next step.

ENTER	To confirm any selection or setting in both programming and editing. In execution, enables the number of the program or current step to be viewed.

DEL **RESET**	To delete any selection or setting.

| STOP | Terminates the current activity (execution or programming). With the machine powered up but not operating, when pressed simultaneously with RESET, it displays the software version installed. |

| START | Starts execution of the selected program. Enables a program to be re-started after a pause. When pressed simultaneously with RESET, it enables the access password to be set. |

¡ SIGNAL 1   **Temperature fault**

Signals a fault in detecting the temperature, normally due to a faulty sensor, or a defective internal circuit
Test always activated.
If the fault occurs during a heating step, the step is aborted, the buzzer is sounded for 2'', the message "TEMP. FAULT" is displayed and the LED lights up. The program continues running, skipping just the heating steps. A fault is to be understood as a temperature, measured in the processor tub, lower than 2° C or higher than 93° C. The LED switches off when a program is started.

¡ SIGNAL 2   **Unbalance**

Lights up immediately after an unbalance, indicating to the operator that the machine has unbalanced at least once during program execution. It switches off when a cycle or program starts up.

¡ SIGNAL 3   **Power failure**

Lights up or switches off with 1'' cycles, alternating with the sound of the buzzer, indicating that there has been a power failure. It switches off immediately after a start or reset.

CHAPTER 3

PROGRAMMING

Programming takes place at three levels:

1) *Programming washing motors*
PASSWORD 45 — Allows No. 15 different washing motor operating modes to be prepared.
For each mode, allows the clockwise rotation time, the pause time, and the anti-clockwise rotation time to be defined.

2) *Programming the cycles*
PASSWORD 12 — For each sequence of steps, creates a sequence of steps in each of which the ports of the various functions can be activated or de-activated (e.g.: drain, feed cold water, feed detergent, spin motor, etc.) can be activated or de-activated.
Passing from one step to the next may be conditional on reaching a defined water level or temperature, or on a timeout. There are five programmable cycles: Prewash - Wash - Rinse - Spin -Unroll. Each cycle can be assigned a number between 1 and 99.

3) *Creation of programs*
PASSWORD 27 — Consists of concatenating, with the desired sequence, the various cycles of: prewash, wash, rinse, spin and Unroll. Up to 30 programs can be stored. Each program can be configured for a maximum of 15 cycles; each cycle can be called up a number of times.

PROGRAMMING

PROGRAMMING THE MOTOR

PROGRAMMING THE MOTORS
PASSWORD 45

When the START and RESET keys are pressed simultaneously, the access password for programming the motors is requested, with the message:

```
? 
```

On entering 45 and then pressing ENTER, the following message will be displayed for two seconds:

```
        * EDIT MOTORS *        
```

You are then asked to enter the number of the motor to be programmed (from 1 to 15):

```
          MOTOR No.          
```

After you have entered the number, two situations are possible:

1- The chosen motor number does not exist.

2- The chosen motor number already exists.

1) The motor does not exist: In this case, you are asked to enter the clockwise rotation time, with the message:

```
        T. FORWARD = S        
```

Enter the required time and press ENTER. The monitor will display the message:

```
         T. PAUSE = S         
```

Enter the required pause time, and then press ENTER. The monitor will display:

```
       T. BACKWARDS = S       
```

Enter the anti-clockwise time required and press ENTER. The monitor will display:

```
┌─────────────────────────┐
│         STORE?          │
└─────────────────────────┘
```

If you press ENTER, the motor operating mode just programmed will be stored, and the monitor will then display a request to enter a new access code, as follows:

```
┌─────────────────────────┐
│           ?             │
└─────────────────────────┘
```

Enter 45 again and press ENTER, and you can program another motor and so on, as required. On pressing RESET, you exit motor programming.

2) The chosen motor already exists: In this case, the following message is displayed:

```
┌─────────────────────────┐
│     ALREADY EXISTS!     │
└─────────────────────────┘
```

Pressing the ENTER key again displays the forward rotation time:

```
┌─────────────────────────┐
│     T. FORWARD = XXs    │
└─────────────────────────┘
```

Pressing INC and DEC allows you to view the program; pressing ENTER allows you to modify the values set.

After having viewed or modified the anti-clockwise rotation time, subsequently pressing INC or ENTER displays the message:

```
┌─────────────────────────┐
│         STORE?          │
└─────────────────────────┘
```

On pressing ENTER you confirm the program currently in memory, or modified, and you exit programming.

On pressing RESET at any time, you exit the current situation, and leave the existing values unchanged.

NOTE:

There are a number of modes for setting the motor:

1) FORWARD - PAUSE - BACKWARDS
   T. FORWARD = SXX   T. PAUSE = SXX   T. BACKWARDS = SXX

2) FORWARD - PAUSE
   T. FORWARD = SXX   T. PAUSE = SXX   T. BACKWARDS = S 0

3) FORWARD
   T. FORWARD = SXX   T. PAUSE = S 0   (Not displayed on monitor)

4) PAUSE - BACKWARDS
   T. FORWARD= S 0   T. PAUSE = SXX   T. BACKWARDS = SXX

5) BACKWARDS
   T. FORWARD= S 0   T. PAUSE = S 0   T. BACKWARDS = SXX

The minimum time that can be programmed for the PAUSE between motor forward and motor backwards is 2 seconds.

The number of drum rpm, for each rotation, is defined while programming the step. In each step the speed can be set to a different value.

PROGRAMMING CYCLES
PASSWORD 12

You can create a "cycle library" for developing programs. When the machine is stopped, pressing START and RESET simultaneously prepares the machine to receive the access password; the machine displays:

No. ?

Enter 12 and then press ENTER to enter programming mode. The machine displays the following message for two seconds:

* EDIT CYCLES *

The message for choosing the programming cycle is then displayed:

PREWASH = ?

Pressing INC and DEC allows the machine to display, in succession, all the other types of cycle:

WASH = ?

SPIN = ?

RINSE = ?

UNROLL = ?

Pressing ENTER when the relative cycle is displayed causes the machine to request the number of the chosen cycle.

Example:

PREWASH = n.

After you have entered the required number (between 1 and 99) and pressed ENTER, two situations are possible:

    1- The cycle chosen does not exist in memory and thus has to be programmed.

    2- The cycle chosen exists already; in this case you can view it and modify it if you wish.

1- The cycle chosen does not exist: you immediately enter the programming phase from the first pass, as shown for two seconds in the following display:

$$\boxed{\text{START STEP 1}}$$

followed by:

$$\boxed{\text{COOLING? NO}}$$

You can now define, in STEP 1, whether or not you wish to activate the cooling phase.
If you wish to activate this phase, press ENTER, and the monitor will display:

$$\boxed{\text{COOLING? YES}}$$

Five parameters will then be presented; these must be programmed in order to activate the cooling phase.
If you do not wish to activate the cooling phase, press INC; the monitor will display:

$$\boxed{\text{BAL. LOAD? NO}}$$

You can now define, in STEP 1 whether or not you wish to activate the load balance phase.
If you wish to activate this phase, press ENTER; the monitor will display:

$$\boxed{\text{BAL. LOAD? YES}}$$

Five parameters will then be presented; these must be programmed in order to activate the load balance phase. If you do not wish to activate this phase, press INC; the monitor will display:

$$\boxed{\text{DRAIN? NO}}$$

In STEP 1 you can now define whether or not to activate the exit shown on the display.

Press ENTER to activate the exit concerned.

By pressing INC and DEC you can scroll on the monitor the messages relative to the various exits available, and their state.

By pressing ENTER or RESET you can change the state of an exit.

After you have programmed all the exits, by proceeding as described above, the monitor will display:

<div align="center">

END OF STEP 1

</div>

and you will immediately be asked to define the cause that will determine passing to the next step.

The causes that can end the STEP are the following:

- Water level
- Water temperature
- Time

Selecting one of the three causes by pressing ENTER causes a message to be displayed asking you to define the value (in cm, degrees Centigrade, or in minutes and seconds) of the parameter chosen.

Example:

<div align="center">

LEVEL NO

ENTER

LEVEL = cm

</div>

Set the required value and then press ENTER.

NOTE:

If the cause of the end of step is a temperature or level, the monitor will display:

<div align="center">

WDT = NO

</div>

You are asked to set the WDT safety timer.
Press ENTER and the monitor will display:

<div align="center">

WDT = m

</div>

Set the time in minutes and press ENTER.

The following will be displayed:

$$\boxed{\text{WDT = s}}$$

Set the time in seconds and press ENTER.
The value set must be reasonably higher than the presumed time for loading or draining, or the time for heating the water in the tub.
The monitor then asks:

$$\boxed{\text{STORE?}}$$

If you answer the question with STOP, the step just programmed will be cancelled; confirming the question by pressing ENTER, the step will be stored, and the start of a new step will be signalled with the message:

$$\boxed{\text{START STEP 2}}$$

At this point you can proceed as in the case of programming the first step, and so on for all the steps required to complete the cycle concerned.
After having programmed the last step, and having confirmed its storage, at the next display:

$$\boxed{\text{COOLING? NO}}$$

Press STOP to terminate programming of the cycle.
The monitor will display:

$$\boxed{\text{PREWASH = ?}}$$

which asks you to choose a new cycle to be programmed.

To exit from cycle programming, press RESET.

N.B.

COOLING PHASE

This is an option included in the steps programming. This means you can carry out a cooling step for the water in the tub before it is completely drained. There are five parameters to be programmed: MINIMUM LEVEL, MAXIMUM LEVEL, TEMPERATURE, WDT, MOTOR.

Functioning is as follows:

a- The water is drained down to the minimum level.

b- Cold water is loaded up to the maximum level, and the temperature is monitored.

c- Loading and draining water is continued until reaching the required temperature; then proceed with the next step.

Throughout the entire phase, a safety time is activated (WDT) that flags a fault if the cooling time is longer than that set in the WDT. The programmed motor is activated throughout the entire phase.

COOLING: On activating with ENTER, five parameters are requested: MINIMUM LEVEL (cm), MAXIMUM LEVEL (cm), TEMPERATURE (°C), WDT (time), MOTOR.

LOAD BALANCED PHASE

This is an option included in the steps programming.
This option allows you to load water, at the same time monitoring the temperature and level.
There are four programming parameters: LEVEL, TEMPERATURE, WDT, and MOTOR.

The option functions as follows:
cold or hot water is loaded depending on the temperature monitored in the tub, which is compared with the one set (hot if the tub temperature is lower, and cold if it is higher) until reaching the programmed level; then the next step can be started.
Throughout the entire phase, the safety timer (WDT) is active, which flags a fault if the balanced load time is longer than the time set in the WDT. The programmed motor is activated throughout the entire phase.

LOAD BALANCED: On activation by pressing ENTER, four parameters are required: LEVEL (cm), TEMPERATURE (°C), WDT (time), and MOTOR.

HEATING

Throughout the phase of programming the steps, when the heating is inserted, the thermo-regulation temperature is requested. In the step where the cause of end of step is the temperature, this value must be equal to or greater than the one causing the end step.
For example, if a value of 50° C was set in thermoregulation and one of 70° C as the cause of end step, the machine would never reach 70° C because, once it reached 50°C, it would start to thermo-regulate.
In cases where the cause of end step is not the temperature, but time or level, the value to set can be between 30° C and 93° C.
You can therefore have thermo-regulation in any step of a cycle, irrespective of the cause of end step.

HEATING: On activating, after pressing ENTER, you are asked to enter a thermoregulation temperature value in degrees C, which must always be higher than or equal to the one that caused the end step (if the cause of end step is a temperature).

MOTOR: On activating after pressing ENTER, you are asked to enter a number relative to the motor functioning mode of the required washing motor (from 1 to 15). (See Programming the Motor, page. 11).
                            When the required motor is confirmed with ENTER, the display will show:

$$\boxed{\text{RPM } =}$$

                            Enter the desired speed value and then push ENTER to confirm.

                            NB The entered speed is the actual speed of the drum. The actual speed of the motor is related to the charachteristics of the motor itself (N. of poles), by the inverter setting and by the ratio between the motor and the drum.

                                In the PREWASH, WASH, RINSE and UNROLL cycles the maximum number of rpm could be only 100. In the SPIN cycle the maximum number of rpm is preset by the password 207.

Activation of the drain removes the display and thus the possibility of inserting the load water, load detergent, and heating relays.

The sequence of messages relative to the output for the PREWASH, WASH, RINSE and UNROLL cycles is as follows:

For EL6 with 16 outputs:

COOLING - LOAD BALANCED - DRAIN - COLD WATER - HOT WATER - HEATING - DETERGENT 1 - DETERGENT 2 - DETERGENT 3 - DETERGENT 4 - HARD WATER - RELAY16 - RELAY11 - RELAY12 - RELAY13 - MOTOR

For EL6 with 24 0utputs:

COOLING - LOAD BALANCED - DRAIN - COLD WATER - HOT WATER - HEATING - DETERGENT 1 - DETERGENT 2 - DETERGENT 3 - DETERGENT 4 - HARD WATER - RELAY 16 - RELAY 11 - RELAY 12 - RELAY13 - MOTOR - RELAY 17 - RELAY18 - RELAY19 - RELAY 20 - RELAY 21 - RELAY 22 - RELAY 23 - RELAY 24

2) The cycle already exists: the monitor displays:

```
  ALREADY EXISTS!
```

At this point, four choices are possible:

a- Choose another cycle by pressing STOP.

b- Access the existing cycle by pressing ENTER. In this case, on pressing INC and DEC, all the exits will be available for display again, and you can modify the configuration using the ENTER and RESET keys, as described earlier.

c- Insert one or more step chosen from the existing ones. To do so, scroll the program step by step using the ADVAN key. The monitor will display the following message for two seconds each time:

```
  START STEP X
```

then:

```
  ALREADY EXISTS!
```

You stop at this point, when the display indicates the start of the step immediately following the one to be inserted.
Press INS and the display will show the following for two seconds:

```
  START STEP X
```

and then, with the request:

```
  COOLING? NO
```

you will be asked to program the new step using the methods already described. After having confirmed storage of the new step/s inserted, press STOP.

d- Remove one or more steps from among the existing ones. Proceed by pressing ADVAN, as already described for the insertion of a step (point **c**), and when the message:

```
  ALREADY EXISTS!
```

appears, relative to the step to be removed, press the DEL key.

The following message will appear:

```
┌─────────────────────────────┐
│           DELETE ?          │
└─────────────────────────────┘
```

which you answer by pressing ENTER to remove the step, or pressing RESET to cancel the operation.
After having confirmed removal of the step/s, press STOP to exit.

NOTE:

Each cycle can comprise a maximum of 100 steps.
A total of 400 steps can be programmed.

PROGRAMMING THE UNBALANCE ROUTINE

If an unbalance should occur during the spin phase, the machine will stop the current phase and call up the routine, on termination of which work will begin again from the point where the spin was stopped.

The unbalance routine is programmed with the "Unroll cycle n.99" which, however, cannot be used in the creation of programs.

PROGRAM CREATION

PROGRAM CREATION
PASSWORD 27

With the machine stopped, if you press START and RESET simultaneously, the machine will be ready to receive the access password:

$$\boxed{\text{No. ?}}$$

On entering 27 and then pressing ENTER, the machine enters programming and the monitor displays:

$$\boxed{\text{EDIT PROG. No.}}$$

The message asks you to enter the number of the program to be edited. On answering with the required number (from 1 to 30), and pressing ENTER, two situations are possible:

1) The program does not exist in memory, and must therefore be created

2) The program already exists and can thus be viewed and modified.

1) The program does not exist: The monitor displays the following message for two seconds:

$$\boxed{\text{NOT FOUND !}}$$

then:

$$\boxed{\text{C1>?}}$$

Press ENTER and the monitor will display

$$\boxed{\text{C1> PREWASH = ?}}$$

Using the INC and DEC keys, you can now choose the type of cycle required: prewash, wash, spin, rinse, and Unroll.
For example, if you wish to insert wash No. 3, you must first display a wash by pressing INC until the message shown below disappears:

$$\boxed{\text{C1> WASH = ?}}$$

and then confirm your choice by pressing ENTER.

At this point the display will ask the number:

```
┌─────────────────────┐
│   C1> WASH = No.    │
└─────────────────────┘
```

Enter 3 and then press ENTER.
Wash No. 3 will be stored as the first cycle of the program.
Subsequently the display will ask you if you wish to program the second cycle, by displaying the message:

```
┌─────────────────────┐
│       C2> ?         │
└─────────────────────┘
```

On confirming your choice by pressing ENTER, the choice of cycle will be displayed again in the same way as has been described above.
You can compile programs with a maximum of 15 cycles chosen freely from those already existing in the cycles library.
You can also call up the same cycle a number of times from within the same program.
After you have programmed and confirmed the last cycle, press STOP to terminate the programming.
The monitor will then display:

```
┌─────────────────────┐
│      STORE?         │
└─────────────────────┘
```

Press ENTER to store the program you have keyed-in; press RESET to cancel everything and return to the point at which you started.

NOTE:

If, when you are choosing a cycle, for example:

```
┌─────────────────────┐
│  C2> WASH = No. 8   │
└─────────────────────┘
```

on pressing ENTER, the message shown below should be displayed:

```
┌─────────────────────┐
│    NOT FOUND!       │
└─────────────────────┘
```

this means that was No. 8 does not exist in the cycles library, and you will therefore have to choose a wash with another number.

2) The program exists: the monitor displays the following message for two seconds:

ALREADY EXISTS!

Then the contents of the program are displayed, starting from the first cycle.

Example:

C1> RINSE = 1

By pressing the INC and DEC keys you can view the various cycles that make up the program. If you wish, you can modify the program concerned, adding or deleting one or more cycles.

a) To delete a cycle you just have to press DEL while the monitor is displaying the cycle to be deleted, then enter STOP in response to the following question:

STORE?

Confirm by pressing ENTER.

The cycle concerned will be removed and all the ones following it will be automatically decremented by one to re-compress the program.

b) If you wish to insert a new cycle between the two existing ones, first display the cycle following the insertion point, then press the INS key; the request to enter a new cycle will then be displayed:

C -> ?

confirm by pressing ENTER, and the cycle to be inserted will be displayed:

Cn> PREWASH = ?

Using the INC or DEC keys, reach the required cycle and then press ENTER.
You will be asked to enter the cycle number:

Cn> PREWASH = No. ?

After entering the number required and pressing ENTER, you can leave the program by pressing STOP; to the question:

STORE?

confirm by pressing ENTER.
The new cycle will be stored at the required point and all the cycles following it will be re-numbered.

NOTE:

If, after the modifications made following the question:

STORE?

you respond with RESET, you exit the editing program and cancel all the modifications made. To exit the editing program, you must press STOP and then ENTER if you want to store a program.

CHAPTER 4

EXAMPLES

PROGRAM EXAMPLE

PROGRAM XX	
1st CYCLE	PREWASH 1
2nd CYCLE	RINSE 2
3rd CYCLE	WASH 3
4th CYCLE	RINSE 2
5th CYCLE	SPIN 5
6th CYCLE	UNROLL 2

Each program may comprise 15 cycles.

Each cycle can be called up a number of times.

CHAPTER 5

PROGRAM EXECUTION

EXECUTION

PROGRAM EXECUTION

On switching on the machine, and on completion of the diagnostics, the machine is ready for a program to be chosen.
You start the machine by entering the chosen program number and pressing ENTER.
At this point the display asks you to confirm before the program begins.
Press START to run the program, or press RESET to cancel the number set.
While the program is running, the monitor displays the current cycle and the cause of the end step of the current step.

Example 1:

Cause of end step LEVEL

```
RINSE 1 LEVEL = cm 12
```

cm. 12 is the actual water level in the tub.
On pressing the LEVEL key the monitor displays, for three seconds, the value of the water level set as end step; during this time, using the INC or DEC keys, you can temporarily modify (but only for the cycle currently running) the value set.
Pressing TEMP allows you to read the current temperature of the water.
Pressing the TIME key allows you to read the range of WDT timer values relative to that level.

Example 2:

Cause of end step TEMPERATURE

```
WASH 3 TEMPERATURE = 35° C
```

35° C is the actual temperature in the tub.
By pressing TEMP you can display, for three seconds, the value of the temperature set as end step. During this time, the INC and DEC keys allow you to temporarily modify (but only for the current cycle) the value set.
Pressing LEVEL allows you to read the water level.
Pressing TIME allows you to read the range of values of the WDT timer relative to that temperature.

Example 3:

Cause of end step TIME

RINSE 1 TIME = 2m 30 s

In this case, the scale of values in minutes and seconds is gradually displayed for the current phase.
Pressing INC or DEC allows you to increment or decrement the time displayed in steps of one minute (only for the current cycle).
Pressing TEMP allows you to read the water temperature.
Pressing LEVEL allows you to read the tub's water level.

NOTE:

During the heating and load/drain water phases, the WDT safety timer is activated, which keeps the machine under control. Expiry of this time causes an alarm to be displayed, indicating that the heating or load/drain water phases have not been completed within the maximum time allowed.

SINGLE CYCLE

You can run a single cycle (pre-wash or spin, etc.) by calling up program N° 0.
The monitor displays "single cycle" and then asks you to choose the required cycle.
This can be done by pressing the INC or DEC keys and then confirming the choice by pressing ENTER.
You must then set the number of cycles (e.g. WASH N° 3) and then confirm by pressing ENTER.
At the next request, "RUN?", pressing START key will start the machine.

N.B. If there is power failure while a single cycle is running the stored machine state is lost.

PARTIAL RUN OF A PROGRAM

A program can be partially run from an intermediate cycle. After choosing the required program, as soon as the monitor displays "RUN?", press the ADVAN key: the cycles contained in the program will be displayed in sequence. At this point, pressing START causes the machine to start running the program not from the start, but from the cycle displayed.

DISPLAYING THE CURRENT PROGRAM NUMBER AND STEP

On pressing ENTER while the program is running, the current program number and step will be displayed.

Example:

PRG 1 STP 3

PAUSE (SOAK)

You can insert a pause at any moment of the wash, with the exception of the distribution and spin phases. To do so, press the PAUSE key. The monitor will display the time, incrementing it relative to the PAUSE state. Pressing the START key will cause the program to restart from the point at which it was interrupted.

N.B. Pressing the PAUSE key disables all the exits, leaving only the drain exit unchanged.

FAST FORWARD

While the program is running, each time the ADVAN key is pressed the current step is terminated.
If the key is pressed while the slow or fast spin exit is activated, the spin cycle currently running is aborted and a pause (slowing) is automatically made to allow the motor to stop.

STOP

At any time, you can stop a program that is running by pressing the STOP key.

N.B. Not active while a single cycle is running.

TOPPING UP

If, while a program is running, in a step where there must be water in the tub, this should go 3 cm below the level set (loss of the discharge valve), water would be automatically called up by excitation of the load cold water relay until reaching the level set for the current step.

This function is activated every time a step starts with a cause of end step level up to a discharge phase.

UNBALANCE

If, during the slow or fast spin phase, due to poor distribution of the washing, the drum should be excessively unbalanced, the spin will stop. The motor slowing pause occurs automatically and then unroll cycle No 99 is called up, which must be programmed as a washing redistribution routine.
If three consecutive unbalances should occur, the program is stopped and the machine enters end of activity state.
Immediately after the first unbalance, the LED (Signal 2) on the front panel illuminates.

POWER-DOWN

If, while a program is running, there should be a power failure lasting less than one second, it is ignored. If the interruption lasts more than one second, the machine stops. When the mains power rerpm, the monitor displays the message "RE-START CYCLE?" and the POWER-DOWN LED on the front panel illuminates (Signal 3).

In the case of an affirmative response (and if a slow or fast spin was not in progress) pressing the START key causes the machine to re-start from the start of the cycle that was interrupted, and the LED switches off. If you wish to cancel the program, you must use the RESET key.

If a slow or fast spin was active, however, the motor slowing times will be automatically set as occurs on pressing the ADVANCE key, momentarily disabling the START and RESET.

N.B. This function is not active while a single cycle is running.

END OF PROGRAM

When a program or a single cycle has stopped, the message "PLEASE WAIT" is displayed and the buzzer is activated for 40s.
On expiry of this time, if the level of water in the drum is less than 3 cm and the temperature is lower than 40° C, the message "END OF ACTIVITIES" is displayed. You can now open the door by pressing the UNLOCK DOOR key.

N.B.

a) During the 40s wait, the buzzer can be silenced by pressing the "RESET" key. If, however, after 40s, the level or temperature value is greater than 3 cm or 40° C, the display shows the value measured in the drum, and does not allow the door to be opened until the values come down below the set limits.

b) If the last cycle has been a spin cycle, the waiting time will be the valued entered with the password 219. This to allow the motor to stop before epening the door.

    n.b.   Password 219: Default value: 40s
                                       Actual Range: from 1s to 200s

MALFUNCTION ALARMS

The device constantly checks the state of the temperature and level transducers to prevent functioning defects due to faults in these or in the measuring circuit.
Also, watch-dog timers (WDT) are used which, by setting a time limits for the water loading/unloading and heating phases, prevent stall solutions due to lack of filling or emptying of the tub, or failure to reach the water temperature.
In the event of a fault, the acoustic signal is activated and the following signals are displayed:

LEVEL FAULT

indicates a fault in the level transducer or the level circuit.
The appearance of this message causes the machine's functioning to be inhibited. It is therefore only possible to exclude the buzzer by pressing the RESET key.

TEMPERATURE FAULT

indicates a fault in the temperature transducer or the temperature circuit.
In this case the machine can start or continue with the washing, skipping the heating phase.
The cold wash carried out is signalled by a special led on the front panel (Signal 1) lighting up.
This is switched off automatically only when a new program is started (START).

WDT TEMPERATURE EXPIRED

indicates that the temperature set within the period required by the WDT has not been reached.
The most probable cause could be a partial or total interruption of the heating resistance.
A very short WDT time, together with a very low temperature of the input water, can also cause this signal.
It is possible, if you wish, to continue the working by pressing the START key.

WDT LEVEL EXPIRED

Indicates that the level set within the time required by the WDT has not been reached.

The most probable causes in this case are:

during the water loading phase:

1- Water inlet solenoid valve fault

2- Absence or reduced delivery of water from the supply plant

3- Discharge valve locked open

4- Defective connection between the tub and level sensor

The operator may, in this case, choose whether to continue the working with a reduced water supply by pressing START, or stop the program by pressing RESET.

during the water drainage phase:

1- Discharge valve locked close

2- Discharge valve locked

3- Discharge pipe blocked

Press RESET to stop the program.

OVERLOADED!

Indicates excessive heating of one of the motors.
In this case press the RESET key to stop the program and allow the motor to cool down. If the signal is repeated during the next wash, call a maintenance technician.

DOOR OPEN!

Indicates that the door is not properly shut.
This signal prevents the machine from being started up, or aborts a program under way.
RESET to exit.

DRAIN

Indicates that, at the start of the slow or fast spin motor, the tub contained a water level greater than that set with password 230. The drain is automatically opened. The machine will resume the interrupted cycle as soon as the level falls below the level preset with password 230.
RESET to abort the cycle or program under way.

CHAPTER 6

SERVICE FUNCTIONS

MAINTENANCE REQUEST

It is possible to preset the number of washes (programs) after which the machine requires maintenance

```
┌─────────────────────────────┐
│        MAINT. REQ.          │
└─────────────────────────────┘
```

The message appears at the START of a program and is repeated at every subsequent START until it is zeroized by the maintenance technician.

MACHINE DISABLING
PASSWORD 118

Keying in the password 118 causes the machine to completely block after the first power failure. The display at Power-Up will show:

```
┌─────────────────────────────┐
│ !                           │
└─────────────────────────────┘
```

Key in the code 118 again to re-enable the machine.

N.B.

Pressing a wrong key which is not the 118 sequence will not allow the machine to be enabled.

CHANGE LANGUAGE
PASSWORD 201

The equipment can display the messages in five languages. To change the language, key in the password 201, and press ENTER.

The following will be displayed

	Language No.
ITALIAN	1
ENGLISH	2
GERMAN	3
SPANISH	4
FRENCH	5

Key-in the number corresponding to the required language and then press ENTER.

SETTING UP FOR 16 OR 24 RELAYS
PASSWORD 205

Each time the password 205 is keyed-in, the machine changes its configuration from 16 to 24, or from 24 to 16 relays displaying a numeric message:

16 or 24

With a 24 relay board in programming, relays from 17 to 24 are also displayed after keying in the password 205.
At the start or after the password 181 (totally cancelling from memory) the machine is set for 16 relays.

MAXIMUM NUMBER OF RPM
PASSWORD 207

With the password 207 it is possible to check and/or modify the maximum number of rpm of the drum, that can be set by the operator (default value = 999). The display will show:

Max Sp   999

If the displayed value is the desired one, push RESET. If it is necessary to change value, push ENTER, than code in the desired value and push ENTER again. The display will show:

YES

TEMPERATURE HYSTERISIS
PASSWORD 209

With password 209 the hysterisis of the thermoregulation temperature is displayed, which automatically starts at 3° C.
If you wish to change the value, press ENTER, key in the new value (Min 1 - Max 10) then press ENTER again to confirm.
If you wish to confirm the value already set, press RESET to exit.

DISPLAY TEMPERATURE
PASSWORD 210 - 211

While executing the temperature display program, the temperature may be expressed in degrees Centigrade or Fahrenheit.
Use the relative passwords:

DEGREES CENTIGRADE	210
DEGREES FAHRENHEIT	211

N.B. In programming, the temperature is always in degrees centigrade.

MAXIMUM LEVEL SETTING FOR WATER IN THE TUB
PASSWORD 212

With password 212, it is possible to display and/or modify the maximum value of the water level in the tub which can be set during the programming phase. The initial value is 100 cm.
The display will show:

```
MAX. LEV.= CM 100
```

If you do not wish to change it, press RESET; if, however, you wish to set a different value, press ENTER followed by the new value and then press ENTER again. The values allowed are from 11 cm to 100 cm

MINIMUM WATER LEVEL IN TUB FOR ENABLING HEATING
PASSWORD 213

The heating of a machine must be enabled if the tub contains a minimum quantity of water. This quantity varies from one machine to another and must, therefore, be set. Using password 213 it is possible to display and/or modify the minimum value which is initialized at 10 cm.
The display will show:

MIN. LEV. = cm 10

If you do not wish to change it, press RESET; if you wish to set a different value press ENTER followed by the new value and then press ENTER again. The values allowed are from 2 cm to 30 cm. The hysterisis is fixed at 1 cm

DISPLAY HOURS OF WORK
PASSWORD 214

Keying-in password 214 displays, for about 3'', the machine's hours' work. This time is increased each time a program starts (START) and until the following message appears:

END OF ACTIVITIES

DISPLAY TOTAL NUMBER OF WASHES
PASSWORD 215

The EL6 is fitted with two meters for counting the number of washes (programs) carried out.
The first is a simple counter with a counting value of 65,000 and is used for counting the total number of washes.
The second is a pre-selection counter and is used for programming the maintenance required.

Using password 215 it is possible to display, for a few seconds, the total number of washes (programs) carried out by the machine from the moment of its installation.

DISPLAY MAINTENANCE REQUIRED COUNTER
PASSWORD 216

Keying in password 216 makes it possible to display the partial number of washes (programs) carried out.

RESETTING MAINTENANCE REQUIRED
PASSWORD 217

This operation is done by using the specific password No. 217.

N.B. This operation does not clear the total number of washes obtained.

PROGRAMMING MAINTENANCE REQUIRED
PASSWORD 218

The number of washes (programs) is set or can be modified using password 218. When the password is keyed-in, the display shows:

1000

The INC and DEC keys can be used to change the value by 10 units every time a key is pressed. By keeping one of the keys pressed, the variation becomes continuous.
On reaching the desired value, press ENTER to confirm, and exit from the situation.

SLOWING TIME
PASSWORD 219

Password 219 can be used to display and/or set the slowing-down time, which is initialized at 40s.
The display shows:

SLOW. TIME =s 40

If you do not wish to change it, press RESET; if you wish to set a different value, press ENTER followed by the new value and then press ENTER again. The values allowed are from 1s to 200s. Initialized at 40s.

NOTE 1:

The time set refers to fast spin.
For slow spin, the time is automatically halved.

NOTE 2:

If a fast spin is aborted after a slow spin has been carried out, the slowing-down time accumulated in the slow spin is not lost but becomes the minimum time for the fast spin.

EEPROM ERASURE
PASSWORD 220 - 181

Partial or total clearing of memory is possible, for service reasons. Password 220 can be used to cancel all programs and cycles, but the machine parameters and Unroll-cycle Number 99 will not be touched. Password 181 can be used to cancel all the memory and the re-initialize all the machine parameters.
After keying in the required code, for both passwords, the machine will ask:

DELETE EEPROM ?

Press ENTER to continue; the display will show:

DELETE EEPROM

for a few seconds, and will then automatically exit from the cancellation routine.
To abort the cancellation press RESET.

MEMORY CARD
PASSWORD 221 - 222 - 223

It is possible to transfer all the programs in memory (EEPROM) of the equipment on to an external memory of the credit card type (memory card) and vice-versa.
This allows you store and subsequently re-use an unlimited quantity of programs.

A- To transfer the memory contents on to a memory card press START and RESET simultaneously, then key-in password N° 221 followed by ENTER; the following message is displayed:

COPY TO M. CARD ?

and on pressing ENTER:

COPY TO CARD

followed a few seconds later by:

COPY OK

B1- To transfer the programs and cycles contained in the memory card to memory, key-in password N° 222.

B2- To transfer the entire contents of the memory card (programs, cycles and parameters) to memory key-in password 223.

The following message will be displayed:

COPY FROM M. CARD ?

on confirming with ENTER:

COPY FROM M. CARD

and a few seconds later:

COPY OK

IMPORTANT NOTE:

The memory card must be inserted deep inside and with the contacts facing upwards. Insertion and removal of the memory card must be done **ONLY** *with the equipment* **NOT** *powered up.*

DISABLING THE ADVANCE KEY
PASSWORD 225

Password 225 disables, in execution, the ADVANCE key.
At every setting of this password, the machine enables or disables the key, displaying the message "YES" for enabled and "NO" for disabled. Initialized with key enabled.

MAXIMUM WATER LEVEL ALLOWED IN SPIN
PASSWORD 230

Password 230 can be used to display and/or modify the maximum level of water allowed in the tub during execution of a slow or fast spin; initialized at 2 cm.
The monitor will display:

SPIN LEVEL cm 2

If you do not wish to change it press RESET; if you wish to set a different value press ENTER followed by the new value and then press ENTER again.
The values allowed are from 2 cm to 60 cm.

SOFTWARE VERSION

Pressing the STOP and RESET keys simultaneously displays the software version installed.

Example:

VERS. EL6 8.0.6

NUMBER OF RPM OF THE DRUM

Pressing the INS key while a program is executed, the display will show the actual number of rpm that have been programmend in the current step.

Example:

MOT.RPM 500

ACCESS PASSWORD

To access, press START and RESET simultaneously, then key-in the desired number:

PROGRAMMING THE PASSWORD

N°	FUNCTION
12	Programming cycles
27	Creation of programs
45	Programming motors

SERVICE FUNCTIONS PASSWORD

N°	FUNCTION
118	Disabling machine
181	Cancels all the memory (programs, cycles, parameters, motors, routine, unbalance routine)
201	Language change: 1 *Italian*, 2 *English*, 3 *German*, 4 *Spanish*, 5 *French*
205	Configuration 16 or 24 relays
207	Maximum number of drum revolutions (default value 999)
209	Temperature hysterisis (min. 1° C, max. 10° C). Initialized at 3° C
210	Temperature displayed in degrees Centigrade
211	Temperature displayed in degrees Fahrenheit
212	Maximum H_2O level that can be set (min. 10 cm, max. 100 cm). (Initialized at 100 cm)
213	Minimum level enabling heating (min. 2cm - max. 30cm). (Initialized at 10 cm)
214	Display number of hours operation
215	Display total number of washes
216	Display number of washes since the last maintenance (partial)
217	Resetting maintenance request
218	Display and setting number of washes maintenance requests
219	Fast spin slowing-down time (initialized at 40s). (Halved for the slow spin) (Range: 1sec - 200 sec)
220	Cancels programs and cycles
221	Copy from EEPROM on to memory card
222	Copy from memory card to EEPROM (only programs and cycles)
223	Copy from memory card to EEPROM (programs, cycles and parameters)
225	Disabling ADVANCE key
230	Maximum H_2O level in spin (min. 2 cm max 60 cm) initialized to 2 cm.

CHAPTER 7

INSTALLATION INSTRUCTIONS

To ensure proper functioning of the equipment you are advised to follow the instructions given below:

1- Fit the power unit as close as possible to the control unit. The flat interconnecting cable must not, however, be longer than 20 cm.

2- Avoid passing powered cables close to the two units and the flat connecting cable (if possible, shield the electronic part from the rest of the system).

3- Fit the remote control switches as far away as possible from the power unit.

4- Fit the R-C groups (suppressers) of an appropriate value at the heads of the coils of the remote control switches and the solenoid valves.

5- The shielded cable of the temperature probe must not pass together with the powered cables.

ENVIRONMENT CHARACTERISTICS

- Max. relative humidity 90% not condensed
- Working temperature 0+ 50°C
- Storage temperature - 20°C+ 65°C

CHAPTER 8

CHAPTER 9