
Programming instructions for the ELC and ELC Plus controller



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Before you begin to set up the ELC / ELC Plus controller, read these instructions fully. Refer also to the ELC, ELC Plus data sheet reference ELC1.2 (2.98).

General operating instructions

The various functions of the Pafra ELC and ELC Plus can be programmed one at a time, with or without the machine in production.

The main display window is provided by an alphanumeric LCD with four lines each of 20 characters. This display shows a number of pages known as the menu.

Individual parameters on a page are selected in between a flashing ..... indicator.

Diagnostic functions are provided by three LEDs connected to trigger, MSD input, and generated output. These LEDs turn green when energised.

Start-up instructions

Before programming can commence, the ELC or ELC Plus controller must be turned on. The following sequence should be followed:

1. Check that the power supply to the controller is connected. The supply should be a switched 240V AC 13 amp single phase supply. This supply should also be clean and free from spikes.
2. Prior to switching on the supply make sure that the power on/off switch on the front of the controller is switched off.
3. Switch on the power supply at source.
4. Turn on the power to the controller by pushing the rocker on the power on/off switch to on.
5. When the power is turned on, the controller will perform a brief initialising procedure. This is a self-diagnostic and preparation program and is indicated on the front of the controller. The display will show:



6. Once the brief initialisation program is successfully completed the controller's display will revert to the last page shown in the menu prior to being turned off.

Key pad operation



When pressed, the function of the test key is to energise the output continuously. With this action the output LED illuminates. Press the test key again to cancel.



Pressing the menu key selects a page of information. Continuously pressing the menu key scrolls round the pages available:

i.e. ELC & ELC Plus:- 6 pages available

In hidden constants:

i.e. ELC:- 8 pages available
ELC Plus:- 10 pages available



Pressing the left and right arrow keys allows for the selection of a particular parameter on the page displayed. That selected parameter is shown in between the flashing cursors:

i.e. 

By continued pressing of one of these keys the cursor scrolls around the parameter options available on the page.

These two keys are also the path to select hidden constants and this is achieved by the following sequence:

- press both keys simultaneously and hold on
- turn the power switch on (this will have induced hidden constants)
- switch power off to cancel.



Press the increase or decrease key to alter a particular parameter. These keys will change a numeric parameter or scroll through the options available in the parameter.

Note: Except for the test key, all of the above keys can be operated whilst the machine is in production or running.

Switching the controller off

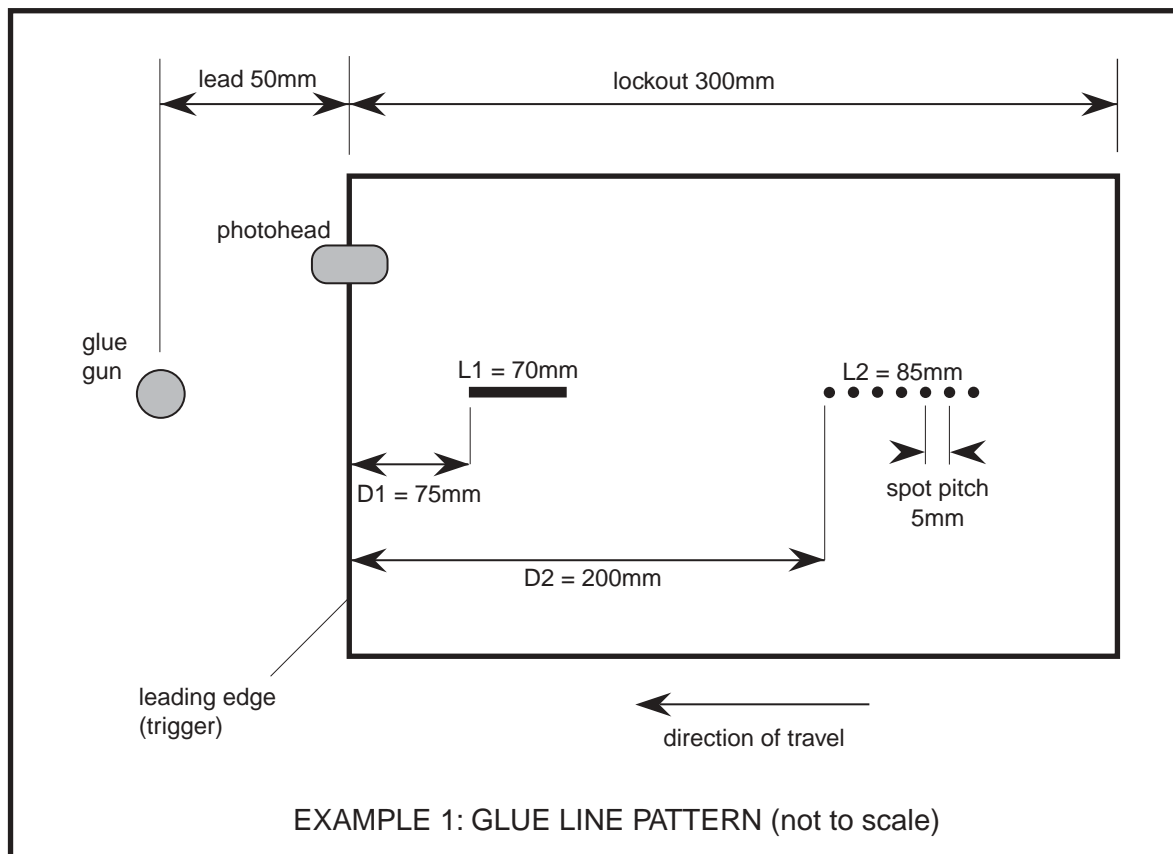
The controller can be turned off at any time by operating the power off switch. All information in the controller will be held in memory and displayed the next time the controller is used.

Programming

For best results, follow these steps in this order:

1. **Decide line positions and lengths**
2. **Position glue guns**
3. **Position photohead**
4. **Enter pattern line 1**
5. **Enter pattern line 2**
6. **Set trigger parameters**
7. **Set spot parameters**
8. **Set compensation value parameters**
9. **Select set / run mode**
10. **Set pressure regulation control (ELC Plus only)**
11. **Production data information**
12. **Select hidden constants**
13. **MSD, custom pulse, hold voltage and high time settings**
14. **Low speed cut-out and low speed spotting settings**
15. **Test pressure setting (ELC Plus only)**

The illustration below is an example of a gluing application, and its parameters are used in the programming instructions in the following pages. Following this example and its settings will help you to familiarise with using the ELC range of controllers.



1. Decide line position and lengths

Look at the work to be glued. Measure and note down the following:

1.1 The start position of the glue line or lines (maximum 2 lines)

Note that the start position of the glue line(s) is known as the **delay** and is referred to in Example 1 as 'D'. The delay distance for any line number is always measured from the trigger edge.

Example 1:- delay for line 1 of pattern (D1) = 75mm
delay for line 2 of pattern (D2) = 200mm

1.2 Measure and note down the glue line lengths required

Example 1:- length for line 1 of pattern (L1) = 70mm
length for line 2 of pattern (L2) = 85mm

1.3 Changing lines to spots

Any of the lines can be converted to a series of spots (see steps 4 and 5).

Example 1:- line 2 (L2) spot pitch = 5mm

Note that for the spot pattern to finish exactly at the end of the line, the line length must be equally divided in whole numbers by the spot pitch. An allowance may be needed for the spot duration.

When a line is switched to spot mode, the line length remains the master setting. Therefore, if the line length is not equally divisible by the pitch, then the last spot may be left off and the line of spots will appear short.

If two lines are used, the spot pitch and spot time must be the same for both pattern line 1 and pattern line 2.

2. Position the glue guns

Only one glue gun is used in Example 1.

3. Position the photohead


The photohead must be positioned in the correct location to detect the trigger edge. In Example 1, the trigger edge is the leading edge of the product. Position the photohead as follows:

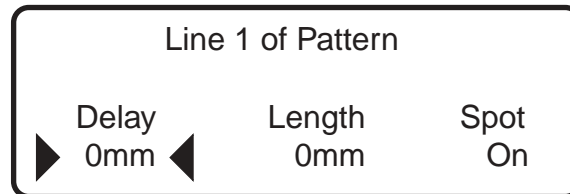
- 50mm from the glue gun towards the feeder (this distance applies in most cases)
- 15mm above the surface of the work (maintain this focal length distance with guiding)
- so that the trigger edge will pass directly under the photohead
- position the photohead over a gap in the machine or a dark, non-reflective surface



The trigger LED on the controller confirms when a trigger signal has been received. The trigger edge can be any edge that the photohead can clearly detect, and is usually either the leading edge or trailing edge of the product or one of its flaps.



4. Enter pattern line 1


Follow these steps to set the delay and line length, and to set the line type, i.e. spotted or solid:



Press the  key until the following page is shown:




Press the  or  key until the cursors flash each side of the **delay** value.



Press the  or  key to change to value of the **delay** until it reads 75mm.

Press the  key and the cursors will move to the **length** parameter.

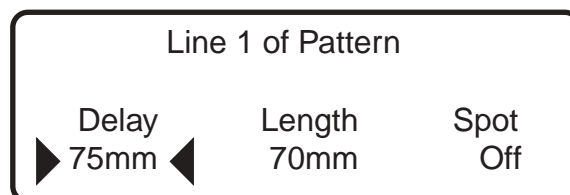
Press the  or  key to change the value of the **length** until it reads 70mm.

Press the  key and the cursors will move to the **spot** parameter.

The first line in Example 1 is a solid line and therefore the spot function is not required.


Press the  or  key until the **spot** parameter displays "Off".

This completes the settings required for **line 1 of pattern** and the display screen should read as follows:





5. Enter pattern line 2


Follow the same steps as in number 4 to set the delay, line length, and to set the line type, i.e. spotted or solid.


Press the  key until the following page is shown:



Line 2 of Pattern		
Delay	Length	Spot
▶146mm◀	0mm	Off


Press the  or  key until the cursors flash each side of the **delay** value.

You will notice that there is a minimum delay value provided automatically. This is calculated by adding the **delay** and **length** from pattern line 1 and adding 1mm. This provides a safety margin so that the lines do not overlap.



Press the  key to change the value of the **delay** until it reads 200mm.

Press the  key and the cursors will move to the **length** parameter.

Press the  or  key to change the value of the line **length** until it reads 85mm.

Press the  key and the cursors will move to the **spot** parameter.


The second line of Example 1 is a spotted line, and therefore the spot function is required.

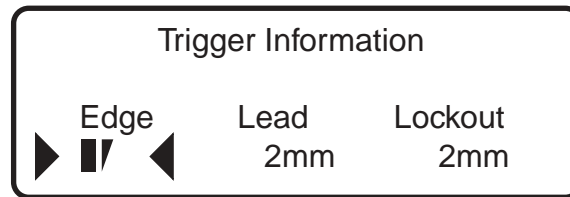
Press the  or  key until the **spot** parameter displays "On".

This completes the settings required for **line 2 of pattern** and the display screen should read as follows:



Line 2 of Pattern		
Delay	Length	Spot
▶200mm◀	85mm	On

6. Set trigger parameters


Press the  key until the page showing **trigger information** is displayed as follows:

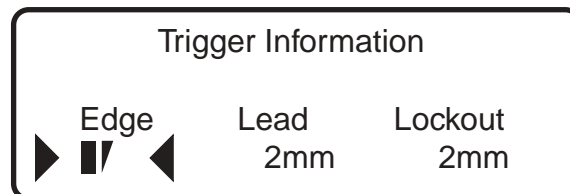


6.1 Edge


Press the  or  key until the cursors are indicating the **edge** parameter.

The **edge** parameter sets the photohead to sense either the leading edge or the trailing edge of the product as the trigger. In Example 1, the photohead is triggering on the leading (front) edge of the product. This arrangement is known as “dark to light” sensing; “light to dark” sensing sets the photohead to trigger on the trailing (rear) edge of the product.



Press the  or  key to set the **edge** mode as follows:




6.2 Lead

Press the  key until the cursors are indicating the **lead** value (minimum 2mm).



The **lead** value is the distance in millimetres from the photohead to the glue gun, and is normally set at 50mm. When entered, this enables subsequent line delay and line length adjustments to be measured from the product’s leading edge. If the lead distance subsequently changes, i.e. if the photohead or glue gun is repositioned, then the **lead** value must be altered accordingly.

Press the  or  key until a **lead** value of 50mm is displayed.


6.3 Lockout

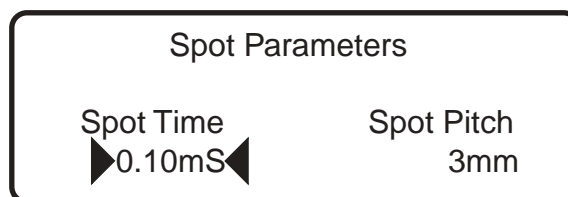
Press the  key until the cursors are indicating the **lockout** value (minimum 2mm).

Lockout is the distance that the photohead passes from the trigger edge (in this case the leading edge of the product) to the other edge of the product (the trailing edge). The photohead will be disabled for the distance entered for the **lockout** value, thereby preventing unwanted triggering caused by any holes or contrasting colours on the product.



Press the  or  key until a **lockout** value of 300mm is displayed.

7. Set spot parameters

Press the  key until the page showing **spot parameters** is displayed as follows:



7.1 Spot time

Press the  or  key until the cursors indicate the **spot time** parameter.


The **spot time** controls the gun opening time, which governs the size of the glue spot. The value is displayed in milliseconds (mS) and is adjustable from 0.10mS to 50.00mS in steps of 0.01mS.

The **spot time** necessary is dependant on several factors including the type of gun, the speed of the machine, the size of spot required, the viscosity of the glue, and the distance from the gun nozzle to the product surface. Therefore, the **spot time** can only be accurately set whilst the machine is running at production speed. However, suggested starting figures are as follows:

- Series 93: 0.80mS Pafra Jet 100/200: 2.50mS
- D.I. 14: 1.50mS MKLS Hot Melt: 8.00mS
- Series 22/33: 1.80mS

Press the  or  key to adjust the **spot time**.


7.2 Spot pitch

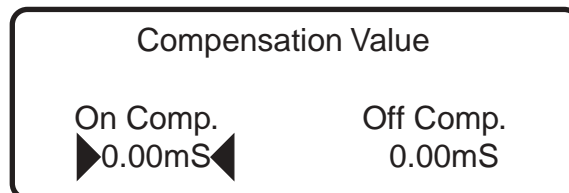
Press the  key so that the cursors move to the **spot pitch** parameter.

The **spot pitch** is the repeat distance between the centre of one spot and the centre of the next spot. In Example 1, the spot pitch is 5mm.



Press the  or  key to set the pitch to 5mm.

8. Set compensation value parameters

Press the  key until the page showing **compensation value** is displayed as follows:



8.1 On comp (on compensation)

Press the  or  key until the cursors move to the **on comp** parameter.


On compensation time represents the **on** response time of the gun, and is needed to keep the line start position consistent. This value is dependent on several variables including glue viscosity, nozzle size and the height of the gun above the product surface. The value is displayed in milliseconds and is adjustable from 0.00mS to 50.00mS in steps of 0.01mS.

Suggested settings for **on compensation** times are as follows:

- | | | | |
|--------------|---------|----------------------|--------|
| • Series 86: | 11.00mS | • D.I. 14: | 3.00mS |
| • Series 87: | 7.00mS | • Series 22/33: | 4.00mS |
| • Series 88: | 8.50mS | • Pafra Jet 100/200: | 3.50mS |
| • Series 93: | 3.00mS | • MKLS Hot Melt: | 6.00mS |

Press the  or  key to set the required value.

8.2 Off comp (off compensation)

Press the  key so that the cursors move to the **off comp** parameter.

Off compensation time represents the **off** response time of the gun, and is needed to keep the line end position consistent. Like **on comp**, this value is dependent on a number of variables. The value is displayed in milliseconds and is adjustable from 0.00mS to 50.00mS in steps of 0.01mS.


Suggested settings for **off compensation** times are as follows (Note: These may vary depending upon glue type and viscosity):



- | | | | |
|-----------------|----------------|--------------------|--------|
| • Series 86: | 6.00mS | D.I. 14: | 3.00mS |
| • Series 87: | 6.00mS | Pafra Jet 100/200: | 3.50mS |
| • Series 88: | 6.00mS | MKLS Hot Melt: | 6.00mS |
| • Series 93: | 4.00mS | | |
| • Series 22/33: | 3.50 to 6.50mS | | |

Press the  or  key to set the required value.

9. Select set / run mode

This function applies when a machine stops during a control cycle. In **set** mode the glue gun will stop when the machine stops, and will resume to complete the current gluing cycle when the machine restarts. In **run** mode the glue gun will stop when the machine stops, but will not start again until the photohead detects a trigger to begin a new gluing cycle.

Press the  key until the page showing **set / run** is displayed.

Press the  or  key to toggle between the two options available: **set** or **run**.

Note that this page shows the software version number in the bottom right hand corner of the display screen; this is relevant only to Pafra.

10. Set pressure regulation control (ELC Plus only)


This page of the ELC Plus menu is dedicated to the accurate control of an in-line glue regulator unit. The control provides settings for four pressure points related to speed. These values are output from the controller in the form of a 0 to 10V signal. Four point control is given to facilitate the rheology of different adhesive types.

The menu page shows two columns of figures, the first being **speed 1** to **4**. **Speed 1** is always set to 0m/min, and the maximum setting for **speeds 2, 3** and **4** is 600m/min.



The second column shows **pressure P1** to **P4**, shown as percentages, 100% being the maximum pressure available at the glue regulator unit.

Below is an example chart:






Press the  until the following page is shown:


Speed 1	0	P1	▶	0%	◀
Speed 2	0	P2		0%	
Speed 3	0	P3		0%	
Speed 4	0	P4		0%	

Press the  or  key until the cursors are indicating the % value for **P1**.


Press the  or  key to set the value for **P1** at 20%.



Press the  key and the cursor will move to **speed 2**.


Press the  or  key to set the value for **speed 2** at 100m/min.

Press the  key and the cursor will move to **P2**.


Press the  or  key to set the value of **P2** at 40%.



Press the  key and the cursor will move to **speed 3**.


Press the  or  key to set the value of **speed 3** at 300m/min.

Press the  key and the cursor will move to **P3**.

Press the  or  key to set the value of **P3** at 50%.

Press the  key and the cursor will move to **speed 4**.

Press the  or  key to set the value of **speed 4** at 450m/min.

Press the  key and the cursor will move to **P4**.


Press the  or  key to set the value of **P4** at 90%.

The display screen should now look like this:

Speed 1	0	P1	▶ 20% ◀
Speed 2	100	P2	40%
Speed 3	300	P3	50%
Speed 4	450	P4	90%

Adjustment of the pressure and speed values can be carried out while the machine is running. Not all of the coordinates have to be used. Unused speed coordinates are set to zero, and their corresponding pressure values will automatically be set to the P1 value.


11. Production data information


Press the  key until the following page is shown:

Production Data	
Speed	0m/min
Work Rate	0/hr
Total	▶xxxxxx◀

This screen is for general information only; it does not affect the performance of the controller.

- **Speed** shows the actual machine running speed in metres per minute.
- **Work rate** shows an average figure of how many products per hour are being processed.
- **Total** indicates the number of products that have been processed by the system since the count was last zeroed. This value increments every time the photohead detects a product.

The **total** count can be zeroed by pressing the  key.



Press the  key to complete the menu loop and return to the **line 1 of pattern** screen.

12. Select hidden constants

The **hidden constants** menu contains parameters which must be set for the channel to suit the guns being used and the application requirements. **Hidden constants** are not available in the normal programming mode as they are considered to be permanent settings which would normally be carried out during manufacture, or by the engineer during installation.

To access **hidden constants**, follow these steps:

- Switch off the controller.

- Press the  and  keys simultaneously and hold while switching on the controller.



- Release both keys.

Once the **hidden constants** menu is accessed, the display will show the following menu:

MSD	▶ 1mm ◀
Custom Pulse	0.01mm
Hold Voltage	5V
High Time	0.0mS

13 MSD, custom pulse, hold voltage and high time settings

13.1 MSD setting

Press the  or  key until the cursors indicate the **MSD** setting.

There are four options which can be used for the **MSD** and these are as follows:

1mm: Refers to a MSD4/1 or MSD5 speed detector.


2mm: Refers to a MSD4 speed detector.



Internal: Internally generated pulse which is a constant 1mS simulating a 1mm MSD at 60m/min.

Custom: Custom option allows the user to input a resolution in the range of 0.01mm to 1.99mm in increments of 0.01mm.


Press the  or  key to select the option required.

13.2 Custom pulse setting

Press the  key and the cursors will move to the **custom pulse** setting.


Press the  or  key to select the value if this option is required.

13.3 Hold voltage

Press the  key and the cursors will move to the **hold voltage** setting.

Hold voltage is the voltage that keeps the gun open once initiated. The value is dependent on the gun being used, but is either 5V or 10V. Normal settings for Pafra guns are:


- 10V: Series 86, 87, 88, 22, 33, Pafra Jet 100/200 and MKLS Hot Melt
- 5V: Series 93 and D.I. 14

Press the  key to select the correct voltage for the gun being used.

13.4 High time setting


High volt time represents the duration of the 33V spike and is dependent on the gun being used. The value is adjustable between 0.10mS and 50.0mS in steps of 0.1mS. Normal settings for Pafra guns are as follows:

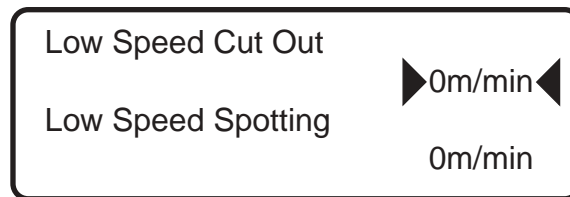
- 10.0mS: Series 86, 87, 88, MKLS Hot Melt
- 2.50 mS: D.I. 14
- 1.0mS: Series 93
- 3.0mS: Series 22/33
- 5.0mS: Pafra Jet 100/200

Press the  key and the cursors will move to **high time**.

Press the  or  key to set the value required.



14. Low speed cut-out and low speed spotting settings

Press the  key and the following screen will be displayed:



14.1 Low speed cut-out


Low speed cut-out is the machine speed below which outputs are inhibited.

Press the  or  key until the cursors move to **low speed cut-out**.

Press the  or  key to input a figure in m/min.


14.2 Low speed spotting

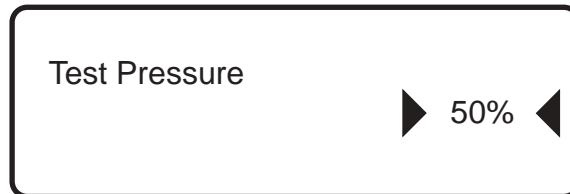
Low speed spotting is a value in m/min, below which the output of the channel is converted into spotting mode. The spotting values are taken from the **spot time** and **spot pitch** values set in the normal programming menus.

Press the  key and the cursors will move to **low speed spotting**.



Press the  or  key to input a figure in m/min.

15. Test pressure setting (ELC Plus only)


Press the  key and the following screen will be displayed:



When the controller is used with a glue regulator unit, it is possible to open the regulator to a preset value when the test button is operated. This value is called the **test pressure** setting and is set in this menu.

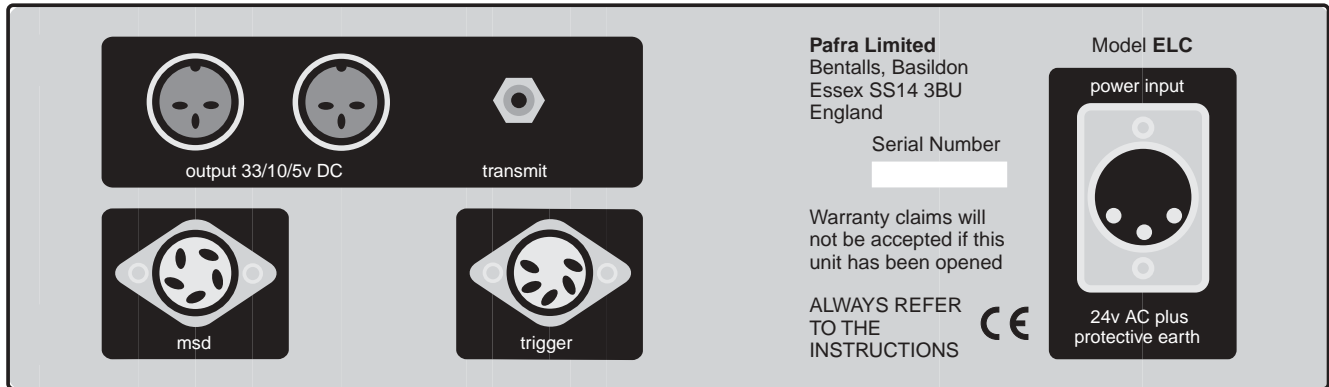
Press the  or  key to select the percentage required.

The programming of **hidden constants** is now complete.

For convenience, pressing the  key will move to the normal programming pages.

However, for normal operation and programming, switch the controller off and then on again to access the normal programming pages only.

Rear panel diagram: ELC controller



Channel outputs:

33/10/5V DC and channel transmit plug sockets for up to two actuators with a transmit jack point offering a 12V DC signal of the channel pattern.

MSD input:

Allows for the input of a standard MSD or one of custom design.

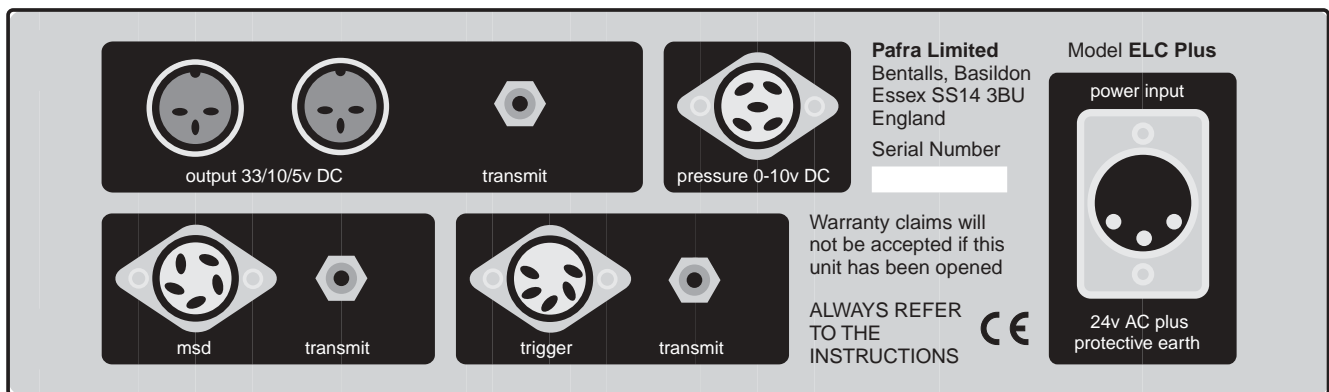
Trigger input:

Allows for the input of a triggering device i.e. photocell.

Power input:

Power input socket: power supplied via a Pafra TR150 transformer.

Rear panel diagram: ELC Plus controller



Channel outputs:

As ELC controller.

MSD input and transmit:

As ELC controller but with the ability via transmit to use the pulses on another unit.

Trigger input and transmit:

As ELC controller but with the ability via transmit to send the signals to another unit.

Pressure signal output:

A variable 0-10V DC signal output of pressure to be connected to a glue regulator unit.

Power input:

As ELC controller.