MTR50 Manual

For timer Version 1.03
Part number 91-00-48

BF ENTRON

BF Entron Ltd.,
Building 80 bay 1
First Avenue
Pensnett Estate
Kingswinford
DY6 7FQ
England

Tel: 01384 455401
Fax: 01384 455551
www.bfentron.co.uk

Contents

Introduction

The MTR50 welding control offers the reliability that ensues from simplicity. The MTR50 is a compact, robust unit providing basic control for resistance welding. The membrane front panel provides a neat, water resistant finish and incorporates four push buttons and a display for programming purposes. Programming is quick and simple, as is operation of the control.

The principle features of the MTR50 are:

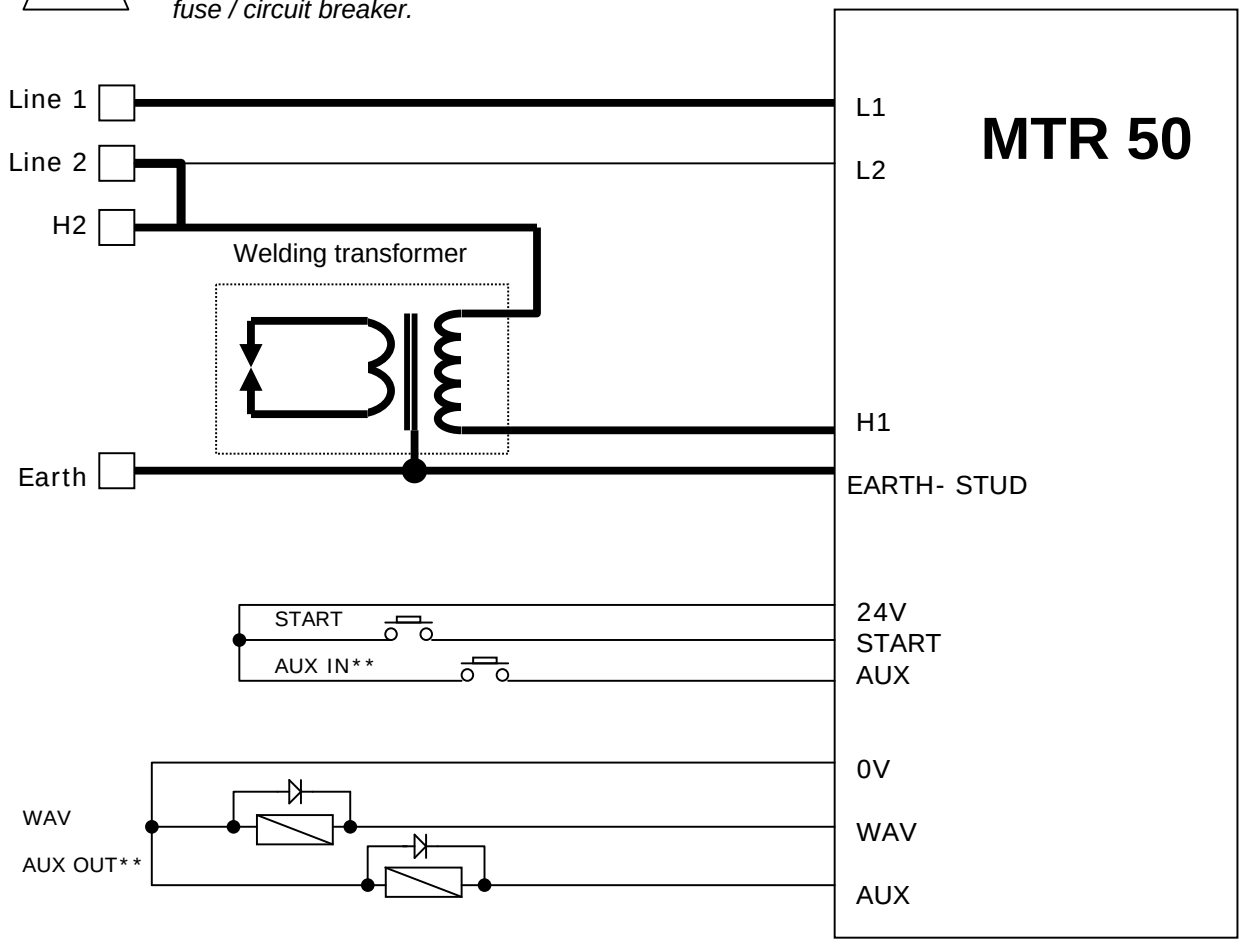
- 50 Hz or 60 Hz operation
- 2 inputs and 2 outputs plus weld on/off
- 8 programmes
- Single or Repeat spot operation
- Two weld intervals and pulsation
- External program select option
- 2-stage initiation option
- Retract/High lift option
- Counter option

Specifications

Mains voltage:	110V,120V,220V,240V,260V*
	380V,415V,440V,480V,500V* (*Range determined at manufacture*)
Mains frequency:	50 or 60 Hz
Duty:	20% Max.
Load:	50kVA Max.
Number of digital inputs:	2
Input requirement:	24 V DC, < 10mA
Number of digital outputs:	2
Digital output rating:	24 V DC, < 500mA
Water:	40 degrees Celsius or less, neutral PH.

Connections

N.B. Mains supply must be suitably rated for application, and correctly protected with fuse / circuit breaker.



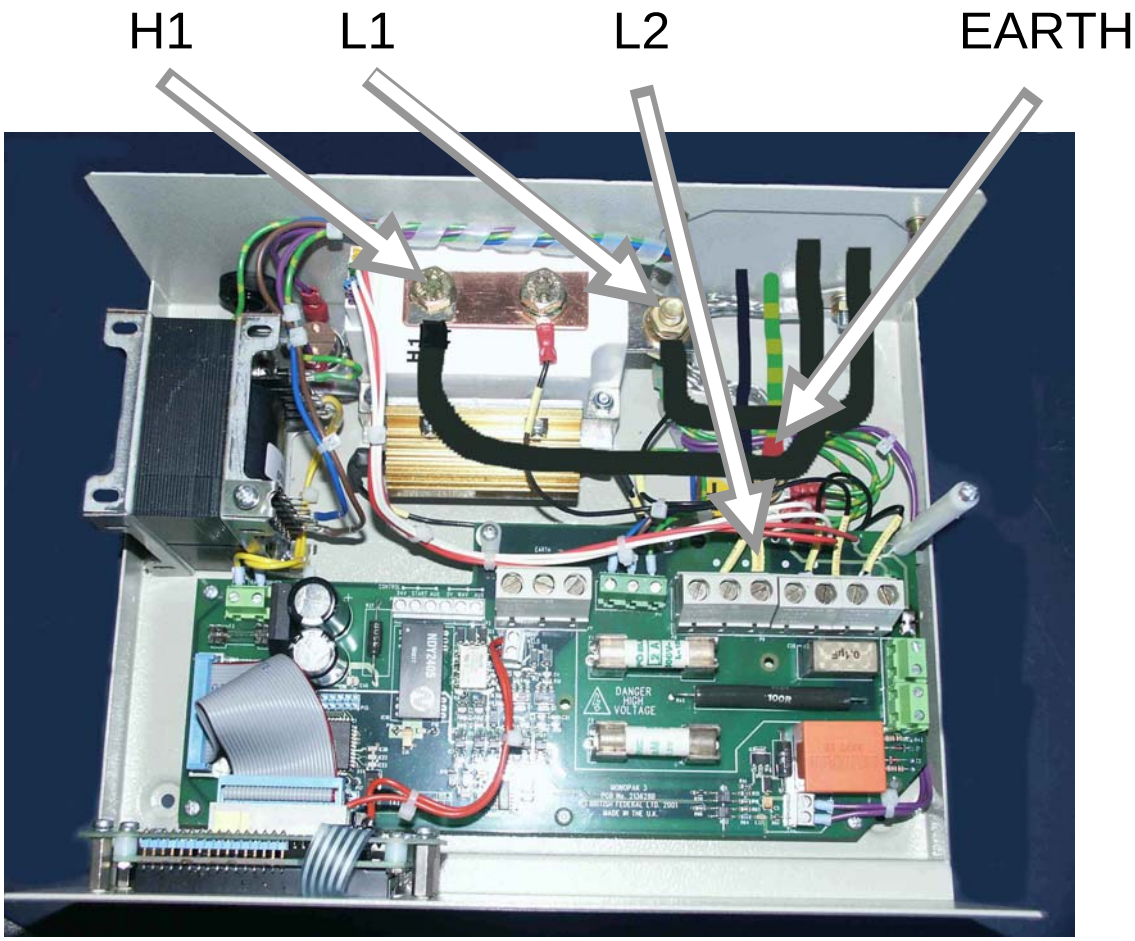
****Note:** The functions assigned to the aux input and aux output depend on the timer configuration. See section on configuration.

Power Connection Location

The connections for the wiring of the timer are shown graphically below.

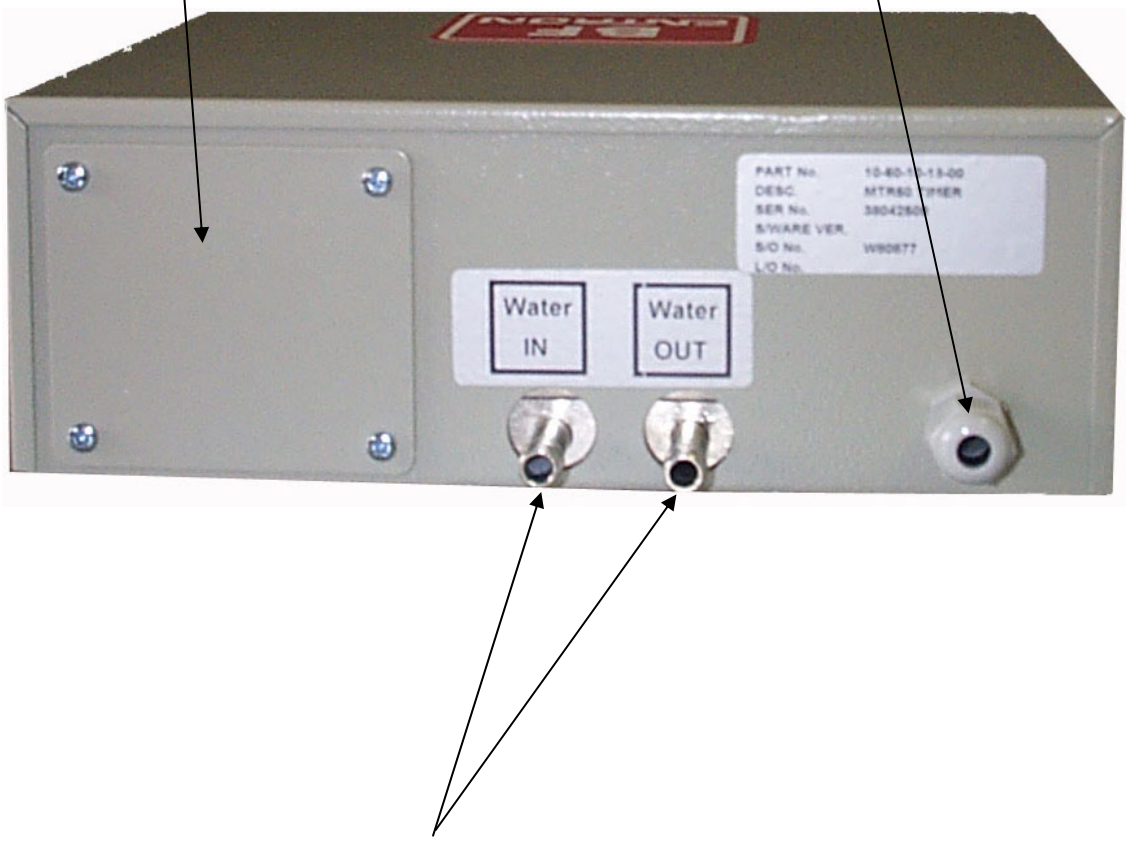
Particular care should be taken to ensure that the wiring sizes are correct for your application and that all local electrical regulations are adhered to.

NB. The Earth connection connects directly to the main earthing stud.



Gland plate for main electrical connections.
Remove this plate and fit suitable cable glands.

Gland for control cable



Water Connection Location

CAUTION! The MTR50 **must** be connected to a suitable water supply before use.

Ensure a minimum flow rate of 4.5 litres per minute, at a maximum of 40 degrees C at the inlet.

Use 3/8 inch ID pipe, secured to the hose barbs with suitable jubilee clips. Test for water leakage **before** applying electrical power to the unit.

Configuring the timer

The MTR50 has various configurations to tailor it for specific applications.

- Press F until it the display reads **MTR50 Vx.xx**
- Hold down ↵ and then press F. The display will read **CONFIGURE**.
- Press ↵ The display will read, for example, **CONFIG TYPE 00** This is the first item in the list of configuration parameters.
  a) If you wish to change the parameter setting (in this case 00), use the + or - keys. Press ↵ to enter the new value. If you do not wish to change this parameter move directly to b). Note that the new value is not stored until the ↵ key is pressed.
  b) Press ↵ to move to the next item in the configuration file.
- Repeat steps a) and b) until the configuration is complete, then press F.

Configuration Parameters

The items in the list of configuration parameters is shown below.

Parameter	Options
Config type	0, 1, 2, 3
Retract	None/Simple High Lift + High Lift -
Frequency	50 Hz or 60 Hz
Interlock	Full / Delay / Off
Heat range	Low or High

Config Type

The MTR50 has 4 modes of operation, numbered as “Types” 0, 1, 2 and 3. Each Type offers different features and may use the aux input and aux output connections in different ways. The following table gives a brief description of what each type does.

The table should be used in conjunction with the tables of input and output allocations which show how the inputs and outputs are used for each configuration type.

Config Type	MTR50 Operation

0	Spot welding with an input for controlling the program number.
1	Spot welding with an external 2nd stage start input.
2	Spot welding with an input and output for controlling the "open" and "working" positions of the welding gun (retract).
3	Spot welding with an input and output for controlling a weld counter.

Input Allocations

Config Type	Start input	Aux input
0	Start	Program select
1	Start	2nd stage start
2	Start	Retract
3	Start	Counter reset

Output Allocations

Config Type	WAV output	Aux output
0	Weld air valve	End of sequence
1	Weld air valve	End of sequence
2	Weld air valve	Retract air valve
3	Weld air valve	Counter output

Retract

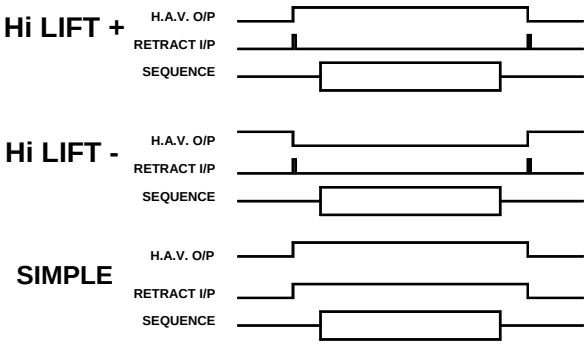
Configuration type 2 provides a retract facility. This feature is used when a welding gun has two "open" states: a wide open state for positioning the gun around a component, and a working state.

There are three modes of Retract operation:

Simple Retract The retract output directly mimics the retract input. The retract output must be off for welding to proceed. If the retract output is on, the display will read "Retract not ready".

Hi Lift + With this mode of retract, an impulse on the retract input changes the state of the retract output. In this case the retract output must be on for welding to take place. If the retract output is off, the display will read, "Retract not ready".

Hi Lift - With this mode of retract, an impulse on the retract input changes the state of the retract output. In this case the retract output must be off for welding to take place. If the retract output is on, the display will read, "Retract not ready".



Frequency

Select frequency of mains supply.

Heat Range

Select heat range High for hotter heat settings. The use of this setting may result in “dead angle” at higher heats. (After a certain point, increasing the heat no longer increases the current).

Select heat range low for cooler heat settings. This should be used if low heat levels in the “High” setting, produce too much current.

Interlock

Select Interlock OFF for machines with no weld air valve, such as pedal spot welders and poke welders. In this mode, the weld sequence is terminated if the Start signal is removed before the sequence has completed.

Select Interlock DELAY for machines where the electrodes are controlled by the MTR50 weld air valve output. In this mode, when a weld sequence has progressed beyond the Squeeze time, the sequence continues to completion, regardless of the state of the Start signal.

Select Interlock FULL for machines operating at very high speeds or in automation systems. In this mode, when a weld sequence has initiated, the sequence continues to completion, regardless of the state of the Start signal. Use with caution! This mode is not available for config type 1 and will default to interlock DELAY.

WARNING! Only use the interlock FULL setting if you are absolutely sure that there is no possibility of an operator becoming trapped by the moving parts of the welding equipment.

Welding with the MTR50

To weld, the MTR50 needs to have been configured for your specific application. (See section on "Configuration"). Having been configured, the timer must be programmed with the weld parameters for the job in hand. Eight sets of weld parameters can be held in the MT50. Each set of parameters is called a "Program".

Selecting a Weld Program

Using timer keypad

Press **F** until the MTR50 displays READY.

Press ↵ . The display will show USE PROGRAM n.

Press either **+** or **-** to select the required program number (n), then press ↵.

Press **F** to return to normal mode.

Note that for configuration type 0, the timer has an external program select line. If this input is on, then this causes the timer to add 1 to the selected program number.

e.g.

USE PROGRAM	AUX INPUT	Program to be run by timer
3	Off	3
3	On	4
7	Off	7
7	On	0

Starting a Weld

When the timer has been configured and programmed, welding can proceed. Select the program to be used (see previous section) and operate the Start input (input 1). A weld sequence will begin.

The Start signal must be held on until the first weld period. If the Start signal is removed before this, the weld sequence will be aborted.

2nd stage input

Note that for configuration type 1, the timer has an external 2nd stage start input. If this input is off, then the sequence will pause at the end of the squeeze time, and the display will show

NO 2nd STAGE

If the Start signal goes off at this point, then the sequence is aborted, and no weld is made. The sequence will not continue until the aux input goes momentarily on.

Programming the weld programmes

Press the F key until the display reads
EDIT PROGRAM 0

Use the + or - key to select the program required. The display will flash. Press ↵ to enter the program number. Press ↵ again to move the programmer to the first parameter. With each parameter use the + and - keys to change the value. This will cause the display to flash. When the value is correct, enter it by pressing ↵. Press ↵ again to move onto the next parameter. At any point F can be pressed to exit programming weld parameters.

The table below shows the welding parameters and the order in which they appear.

Parameter	Range of values
Mode	Single or Repeat
Heat 1	0 – 99
Heat 2	0 – 99
Presqueeze **	0 – 99
Squeeze	0 – 99
Weld 1	0 – 99
Cool 1	0 – 99
Weld 2	0 – 99
Cool 2	0 – 99
Pulses	1 – 9
Hold	0 – 99
Off **	0 – 99

**NOTE: these parameters will only appear if the MODE parameter has been set to REPEAT.

Program parameters

Mode Selects either Single Sequence or Repeat Sequence operation. Single Sequence operation performs one weld sequence when the timer is initiated. Repeat Sequence performs successive weld sequences for the duration of the Start signal.

Heat 1 Controls the heat of the first weld interval.

Heat 2 Controls the heat of the second weld interval.

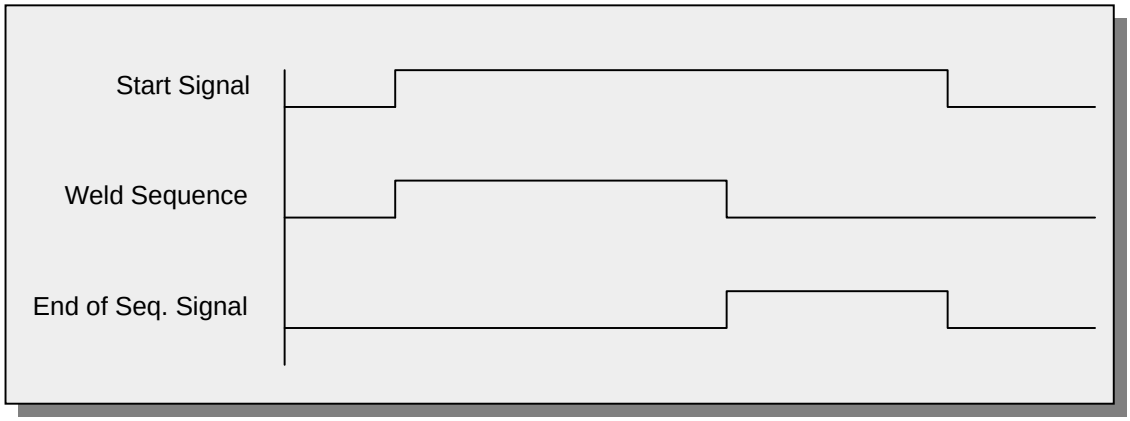
Presqueeze The time (in cycles) allowed for the electrodes to initially meet (only used for the first spot in repeat mode).

Squeeze The time (in cycles) allowed for the electrodes to build up full welding pressure on the component.

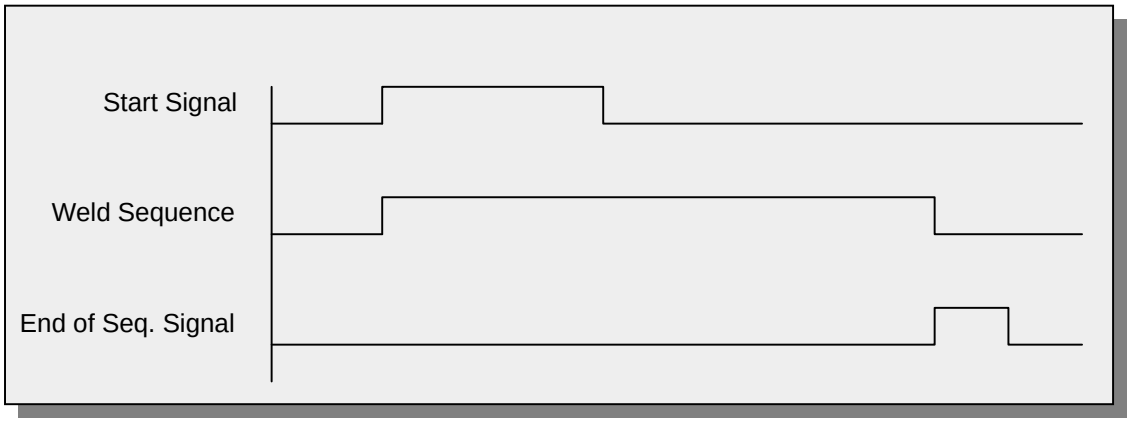
Weld 1	The duration (in cycles) of the first weld interval.
Cool 1	The time (in cycles) between the first and second weld intervals.
Weld 2	The duration (in cycles) of the second weld interval.
Cool 2	(Only applicable when using pulsations) The time (in cycles) between pulses of Weld 2.
Pulses	The number of pulses of Weld 2.
Hold	The time (in cycles) for which welding pressure is maintained on the weld after welding current has ceased.
Off	(Only applicable in Repeat mode). The time (in cycles) between successive weld sequences.

End of Sequence Output

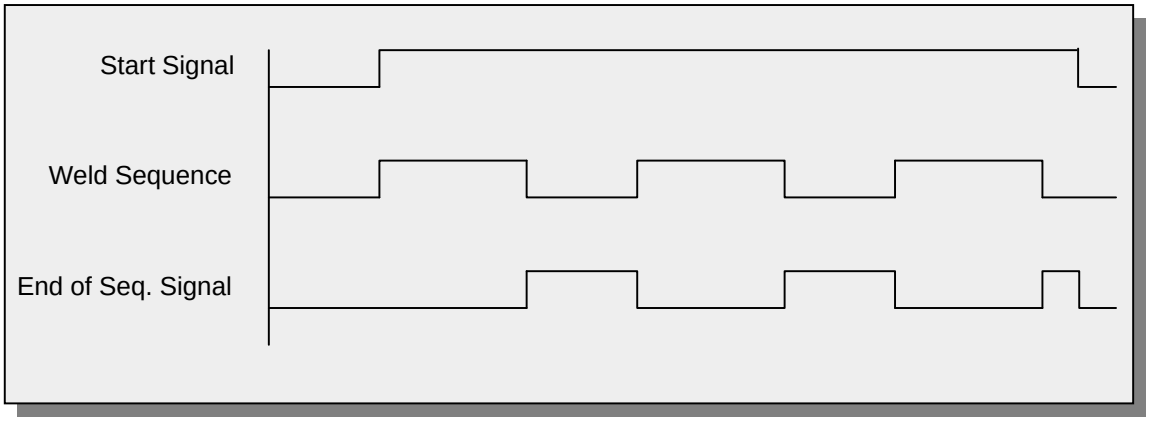
For configuration types 0 and 1, at the end of the weld sequence the End of Sequence output switches on. If the Start signal is still present, the End of Sequence signal remains on until the Start signal is removed.



In Single Spot operation, at the end of the weld sequence the End of Sequence output switches on. If the Start signal is absent, the End of Sequence signal switches on only momentarily.



In Repeat Spot operation the End of Sequence output switches on for the Off time between sequences, and momentarily after the final sequence.



Counter

Configuration type 3 provides a counter facility. In this, an “End Count” value is programmed into the MTR50. A counter within the MTR50 increments each time a weld sequence is completed. When the number of welds completed equals the number of welds programmed as “End Count”, the Count Output switches on.

If “Stop at End” has been programmed, the timer will ignore Start inputs when this stage has been reached. If “Continue at End” has been programmed, welding can continue.

The counter and the Count Output can be cleared by applying a signal to the Reset input.

At any stage the progress of the counter can be observed, and changed if required.

- Press F until it the display reads **COUNTER**
- Press ↵ The display will read, for example, **COUNT NOW = 0005**

  a) If you wish to change the parameter use the + or - keys. Press ↵ to enter the new value. Note that the new value is not stored until the ↵ key is pressed.

  b) Press ↵ to move to the next item in the counter file.
- Repeat steps a) and b) until the counter set-up is complete, then press F.

Counter Parameters

The items in the list of counter parameters is shown below.

Parameter	Options
Count now	0 .. 9999
Count up to	0 .. 9999
Stop at end	Stop or Continue

Count now: this is the value presently counted. This can be reset to zero by applying the reset counter input, or by entering zero from the keypad.

Count up to: this is the value which defines the end of the count. When ***Count now*** is greater than or equal to ***Count up to***, the counter output will turn on.

Stop/Continue at end: If ***Stop at end*** is selected, then no further welding is permitted when the end of count is reached. If ***Continue at end*** is selected, then further welding may take place, but the counter output will remain on.