



TT33

Digital Multifunction Timer

User Manual



Tempatron: Eltime House, Hall Road, Maldon, Essex, CM9 4NF UK.

Telephone: +44(0)1621 859500 Email: sales@tempatron.co.uk Web: www.tempatron.co.uk



Please read this document carefully before using this product. The product guarantee will become invalidated by any damage to the timer caused by not following the instructions in the user manual. Tempatron do not accept any liability for personal injury, material damage or capital losses which may arise by not following the instructions in the user manual.

- 4 digit red LED display panel mounting digital timer
- 5 programmable timing modes
- Time ranges from 0-99.99sec to 0-9999hrs
- 24Vac/dc or 100-240Vac powered
- 1 changeover and 1 N/O relay output
- Programmable reset function
- Easy to programme through front keys
- Status and timing indicators
- Selectable up/down timing
- EEPROM memory (minimum 10 years)
- Security passcode
- IP65 enclosure



CE **RoHS**
Compliant

TECHNICAL SPECIFICATION

ENVIRONMENTAL CONDITIONS

Operating/Storage Temperature: 0°C to +50°C / -20°C to +60°C
Protection Class: IP65
Maximum Installation Height: 2000m



Do not use this timer in locations where corrosive or flammable gases could be present.

ELECTRICAL

Power Supply Voltage: 24Vac/dc or 100-240Vac
Power Consumption (Burden): <3VA
Frequency: 50/60Hz
Wiring: 2mm² screw type terminals
Data Retention: EEPROM (minimum 10 years)
CE Markings: **Directive LV 2014/35/EU** (EN 60730-1, EN 60730-2-7, EN 61812-1, UL 508)
Directive EMC 2014/30/EU (EN 55011: class B; EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6)

OUTPUTS

Relay Outputs (R1 & R2): Out1: Single pole changeover contact 16A rated at 240Vac (resistive load)
Out2: Single pole N/O contact 5A rated at 240Vac (resistive load)
Relay Contact Life: Mechanical 1,000,000 operations
Electrical 100,000 operations
Reset Time: 100ms approx.
Accuracy: ±3sec/24hours

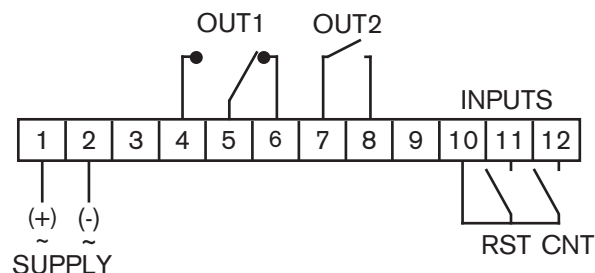
HOUSING

Housing Type: Panel mounting
Display: 4 digit red LED display
Dimensions: 78mm wide x 35mm high x 64mm deep
Weight: Approximately 130g (without packaging)
Enclosure Materials: Self extinguishing plastics, UL 94 V0

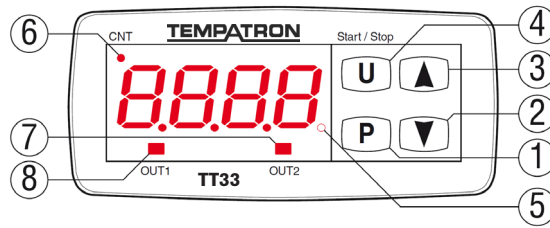


When cleaning the timer, solvents (thinners, gasoline, acid etc.) or corrosive materials must not be used.

WIRING CONNECTIONS



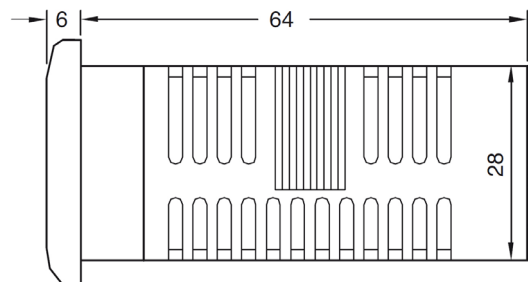
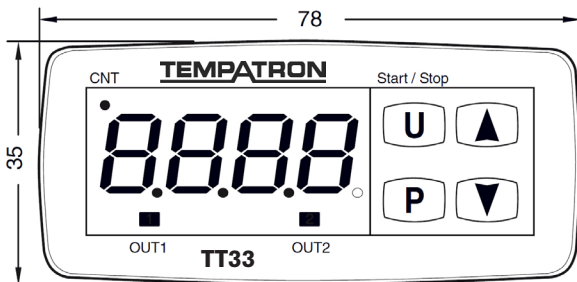
FRONT PANEL DISPLAY FUNCTIONS



KEYS & DISPLAY SYMBOLS

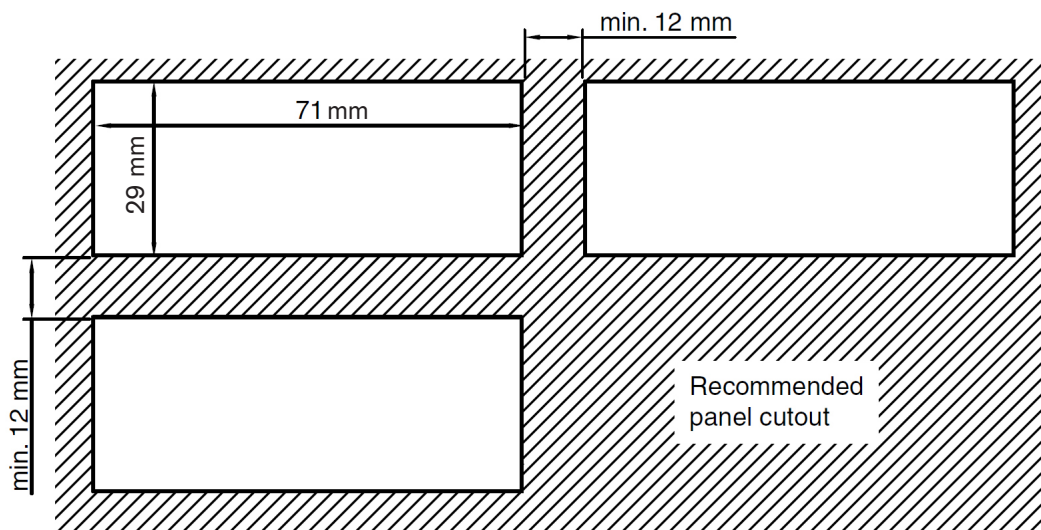
1. **P**: Press and release to set the time delays (if programmed with the *tEdt* parameter). Press for 5 seconds to enter the programming mode. Press again to access the parameter edit mode and confirm the values. In programming mode press together with the **▲** key to change the programming level of the parameters. When the keys are locked press the **P** and **▲** keys together for 5 seconds to unlock the keys.
2. **▼**: When in programming mode, press to decrease the setting value and to select parameters.
3. **▲**: When in programming mode, press to increase the setting value and to select parameters. In programming mode press together with the **P** key to change the programming level of the parameters. Press together with the **P** key to unlock the keys.
4. **U Start/Stop**: Press for Start/Stop/Reset functions as programmed using the *tUF* parameter.
5. **SET LED**: In normal operating mode this indicates the time delays are being set. In programming mode this indicates the parameter programming level.
6. **CNT LED**: Indicates count in progress (flashes every 1 second), count interrupted (steadily on) or the reset status (off).
7. **OUT2 LED**: Indicates the status of output relay 2 (illuminated for ON and not illuminated for OFF).
8. **OUT1 LED**: Indicates the status of output relay 1 (illuminated for ON and not illuminated for OFF).

DIMENSIONS



All dimensions in mm

PANEL CUTOUT



SET TIME PROGRAMMING (FAST MODE)

1. To set the delay times (set times) press the **P** key, the **SET** LED will illuminate and the display will show S_{t1} (parameter acronym) and its programmed value. To change the value press the **▲** key to increase the value shown or the **▼** key to decrease it. Note: Press the **▲**/**▼** keys for longer than 1 second to increase/decrease the numerical value more quickly.

Through programming the $tEdt$ parameter it is possible to select which set times can be set in this fast mode. An option also exists which allows the setting of the S_{t1} set time value only using the **▲**/**▼** keys without pressing the **P** key in advance ($tEdt = 8$). The options for the $tEdt$ parameter are as follows:

oF No set time can be set with the **P** short key (if pressed and released the **P** key has no effect).

- 1 Only S_{t1} set time value can be set with this procedure.
- 2 Only S_{t2} set time value can be set with this procedure.
- 3 S_{t1} and S_{t2} set time values can be set with this procedure.
- 4 Only S_{t3} set time value can be set with this procedure.
- 5 S_{t1} and S_{t3} set time values can be set with this procedure.
- 6 S_{t2} and S_{t3} set time values can be set with this procedure.
- 7 S_{t1} , S_{t2} and S_{t3} set time values can be set with this procedure.
- 8 S_{t1} set time value can be set directly with the **▲**/**▼** keys.

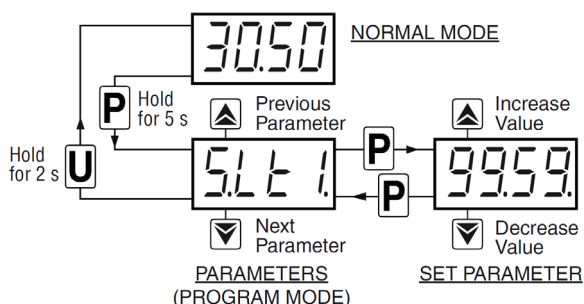
For example, when the **P** parameter is set to **1** or **3**, the procedure is as follows:

- Press and release the **▲** key, the display shows S_{t1} alternated with the S_{t1} value.
- To change the set time, press the **▲** key to increase the value or the **▼** key to decrease the value.
- If $tEdt = 1$, once the desired value has been set, press the **P** key to exit the set time programming mode.
- If $tEdt = 3$, pressing and releasing the **P** key the display shows S_{t2} alternating with the value. To change the value use the **▲**/**▼** keys using the same method as for the S_{t1} value.
- Once the set time(s) have been programmed, press the **P** key to exit the set time programming mode. If no key is pressed for over 10 seconds the display will automatically return to normal operation.

S_{t1} and S_{t3} can be set within the limits established by parameters S_{L1} and S_{H1} and S_{t2} can be set within the limits established by S_{L2} and S_{H2} .

PARAMETER SETTING MODE

To access the timer function parameters when passcode protection is disabled, press the **P** key for 5 seconds, after which the display shows the code that identifies the first programmable parameter. Use the **▲**/**▼** keys to select the desired parameter then press the **P** key, the display will then show the parameter code, alternated with its value, that can then be changed with the **▲**/**▼** keys. Once the desired value has been reached, press the **P** key again to store the new value, the display will then return to show the parameter code. Press the **▲**/**▼** keys to select any other desired parameters and change them using the same method. To exit the programming mode, press no key for 30 seconds or keep the **U** key pressed for 2 seconds. The timer display will then return to showing the timing count value.

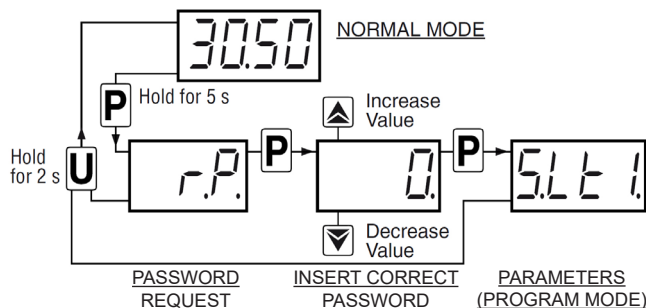


PARAMETER PROTECTION USING A PASSCODE

The timer has a parameter protection function using a passcode that can be personalised through the tPP parameter. To protect the parameters, set the tPP parameter to your desired passcode number.

When the passcode protection is active, press the **P** key for 5 seconds after which the display shows tPP . Press the **P** key and the display will show **0**. Using the **▲**/**▼** keys, enter the programmed passcode number and press the **P** key again. If the passcode is correct the timer will display the code of the first programmable parameter and it is possible to program the timer as previously described.

The passcode protection can be disabled by setting $tPP = oF$.



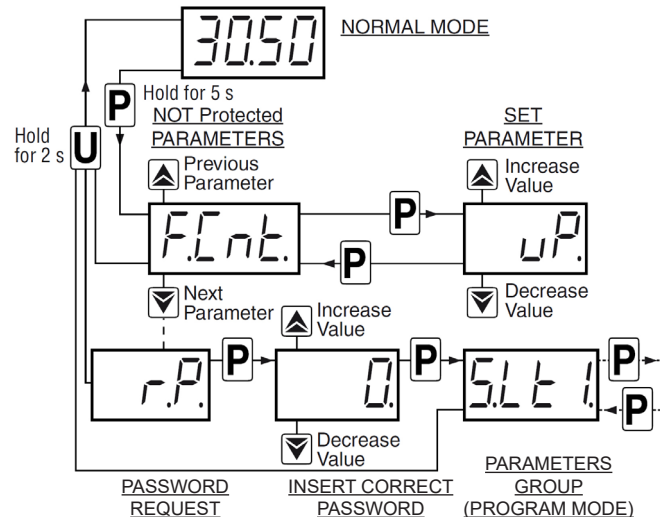
Notes:

1. All parameters are configured by default as protected so that by simply setting the tPP parameter they are all protected by the passcode.
2. If the passcode is lost, switch the timer OFF then ON, pushing the **P** key during initial test and keeping it pressed for 5 seconds. All programmable parameters are then accessible and parameter tPP can be set as required.

All parameters are configured by default as protected. To make certain parameters programmable without protection whilst keeping the protection on other parameters, the procedure is as follows:

- Enter program mode using the \overline{LPP} passcode and with the $\blacktriangle/\blacktriangledown$ keys, select the parameter that must be accessible without passcode protection.
- Once the parameter is selected, if the **SET LED flashes** the parameter is programmable only after entering the passcode (protected).
If the **SET LED** is steadily **ON** the parameter is programmable without entering the passcode (unprotected).
- To change the parameter protection, press the \overline{P} key and keeping it pressed, also press the \blacktriangle key.
- The **SET LED** changes its state indicating the new level of parameter protection (**ON** = unprotected, **Flashing** = passcode protected).

If some parameters are set as unprotected, when accessing the programming mode the display first shows the unprotected parameters then the parameter \overline{rP} through which it will then be possible to access the protected parameters.



To reset all parameters to the factory default values enter **-48** at the **rP** passcode request. The passcode must first be enabled by setting parameter **LrP** so that the **rP** setting is requested. Enter the **-48** value and press the **P** key to confirm. The display shows “- - -” for 2 seconds and then all parameters have been reset to the factory default values.

It is possible to completely lock the timer keys. This function is useful when the timer is being used in an accessible area and unauthorised changes must be avoided. To activate the key lock, program the parameter $\underline{L.L.O}$ to a value different from **OF**. The $\underline{L.L.O}$ value is the time in seconds of key inactivity after which the keys are automatically locked. When the keys are locked, if any of the keys are pressed the display shows $\underline{L.L}$ to indicate the key lock is active. To unlock the keys press the **P** key and **▲** key together for 5 seconds, $\underline{L.F}$ will then appear on the display and all the key functions will be active again.

The internal buzzer can be programmed using the F_{buz} parameter to operate as follows:

- oF Internal buzzer disabled.

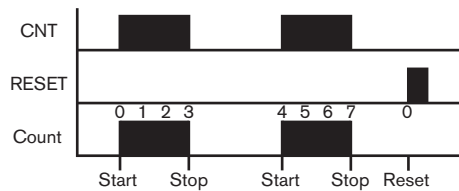
- 1 The internal buzzer operates at the end of S_{t1} for S_{t2} period. The buzzer also sounds when keys are pressed. If a **Reset** command is activated (by a key or digital input), the buzzer is silenced immediately. This buzzer mode is only active for timing operating modes that do not use the S_{t2} time.
- 2 The internal buzzer operates at the end of S_{t1} for S_{t2} period. The buzzer does not sound when keys are pressed.
- 3 The buzzer only sounds when keys are pressed.
- 4 Only the external buzzer output is activated at the end of S_{t1} for S_{t2} period (if **OUT2** configured with $F_{out2} = 5$).

Timing diagram for the first example:

- CNT:** Three pulses. The first pulse occurs during the first count sequence (0-5). The second pulse occurs during the second count sequence (6-9). The third pulse occurs during the Stop/Reset phase.
- RESET:** One pulse at the end of the sequence, during the Stop/Reset phase.
- Count:** Shows two sequences of counts. The first sequence is 0 to 5, and the second sequence is 6 to 9. The counts are labeled below the bars.

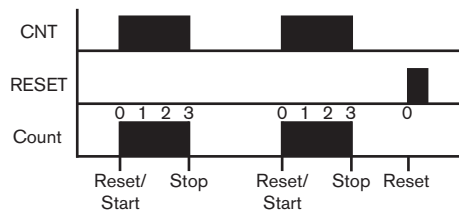
Activating the **CNT** input starts the timer counting and the **CNT** input can then be deactivated. Activating the **CNT** input again stops the counting on the value reached (without disabling the output if this was activated). The next **CNT** impulse resumes the count from the point it stopped, and so on, until the end of the count or the **Reset** signal. In this mode the **[U] Start/Stop** key (if **LUFL = 2**) acts exactly the same way as the **CNT** input with the addition that, when pressed for 2 seconds during the counting, performs the **Reset** command. If the counting has finished, pressing the **[U]** key performs the **Reset-Start** command at the same time.

Activating the **CNT** input resets and starts the timer counting and the **CNT** input can then be deactivated. Activating the **CNT** input again, if done before the end of the count, stops the count (disabling the output if this was activated). The next **CNT** impulse starts a new count cycle or if the second **CNT** impulse arrives after the end of the count, a new count cycle is started. In this mode the **U** **Start/Stop** key (if $\text{LUF} = 2$) acts exactly the same way as the **CNT** input.



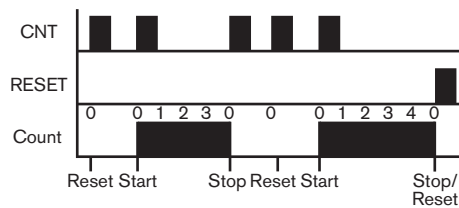
$iF_{ct} = 3$ Monostable Start/Stop

Activating the **CNT** input and keeping it active, starts the timer counting and the count then stops on the value reached when the **CNT** input is deactivated (without disabling the output if this was activated). The next **CNT** impulse resumes the count from the point it stopped, and so on, until the **Reset** signal. In this mode the **Start/Stop** key (if $iLUF_{ct}$ is different to **oF**) only acts as a **Reset**.



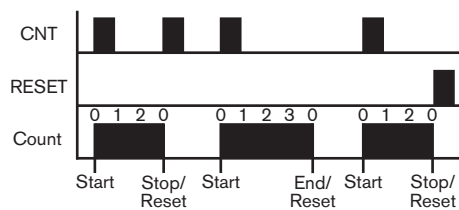
$iF_{ct} = 4$ Monostable Reset-Start/Stop

Activating the **CNT** input and keeping it active, resets and starts the timer counting and the count then stops on the value reached when the **CNT** input is deactivated (disabling the output if this was activated). This count operation mode is similar to a traditional timer in which the counting is enabled when the timer is powered and the **Reset** occurs when the power supply is removed. In this mode the **Start/Stop** key (if $iLUF_{ct}$ is different to **oF**) only acts as a **Reset**.



$iF_{ct} = 5$ Bistable Reset-Start/Stop

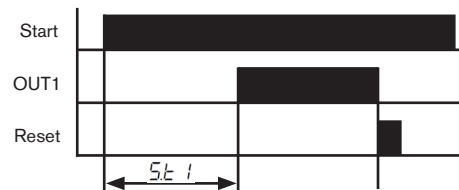
Activating the **CNT** input **Resets** the timer. Activating the **CNT** input again starts the timer counting and activating the **CNT** input for a third time stops the count on the value reached (disabling the output if this was activated). In this mode the **Start/Stop** key (if $iLUF_{ct} = 2$) acts exactly the same way as the **CNT** input.



$iF_{ct} = 6$ Bistable Start/Stop-Reset

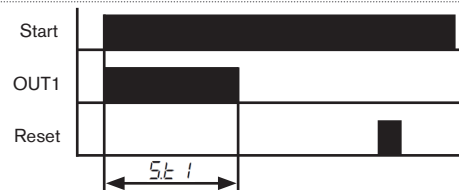
Activating the **CNT** input starts the timer counting and the **CNT** input can then be deactivated. Activating the **CNT** input again, if done before the end of the count, stops the count (disabling the output if this was activated) and **Resets** the count. If the second **CNT** impulse arrives after the end of the count, a new count cycle is started. In this mode the **Start/Stop** key (if $iLUF_{ct} = 2$) at the end of $S_{ct} 1$ time acts exactly the same way as the **CNT** input.

OUT1 OPERATING MODES



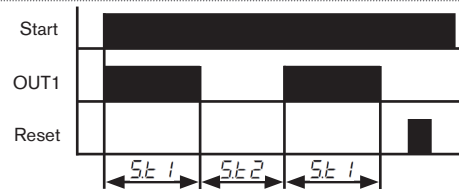
$F_o It = 1$ Delay on Energise (On Delay)

The timer starts counting when the **Start** signal is activated. At the end of the time period $S_{ct} 1$, the output relay **OUT1** energises and remains energised until the **Reset** signal is activated.



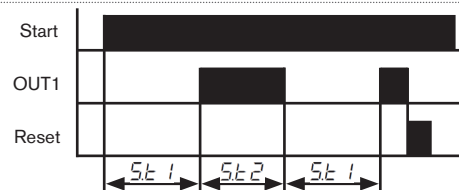
$F_o It = 2$ Interval

The timer starts counting and the output relay **OUT1** energises when the **Start** signal is activated. At the end of the time period $S_{ct} 1$, the output relay **OUT1** de-energises. The output can only be reactivated after a **Reset** signal and a new **Start** signal.



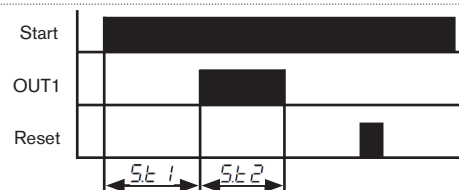
$F_o It = 3$ Immediate Cycle with Variable On and Off Times

The timer starts counting and the output relay **OUT1** energises when the **Start** signal is activated. At the end of the time period $S_{ct} 1$, the output relay **OUT1** de-energises and then after time period $S_{ct} 2$ **OUT1** energises again and this repeats indefinitely until the **Stop/Reset** signal is activated.



$F_o It = 4$ Delayed Cycle with Variable On and Off Times

The timer starts counting when the **Start** signal is activated. At the end of the time period $S_{ct} 1$ the output relay **OUT1** energises and then after time period $S_{ct} 2$ **OUT1** de-energises. After a further time period $S_{ct} 1$ **OUT1** energises again and this repeats indefinitely until the **Stop/Reset** signal is activated.



$F_o It = 5$ Single Delayed Cycle with Variable On and Off Times

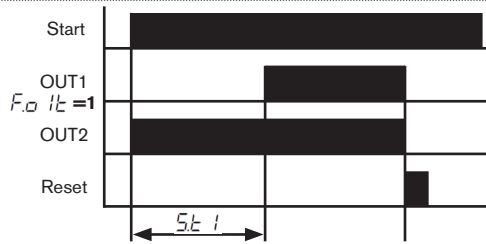
The timer starts counting when the **Start** signal is activated. At the end of the time period $S_{ct} 1$ the output relay **OUT1** energises and then after time period $S_{ct} 2$ **OUT1** de-energises. The cycle can only be reactivated after a **Reset** signal and a new **Start** signal.

OUT2 OPERATING MODES

The second output (**OUT2**) can be programmed in one of 5 different operating modes with the F_{o2t} parameter.

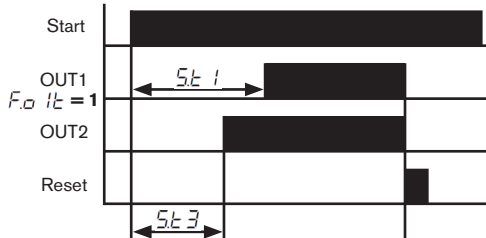
$F_{o2t} = 0$ **OUT2** disabled

$F_{o2t} = 1$ **OUT2** operates exactly the same as **OUT1** to give a double output contact



$F_{o2t} = 2$ **Instantaneous Contact**

OUT2 is energised during the counting process and remains energised until the **Reset** signal is activated.

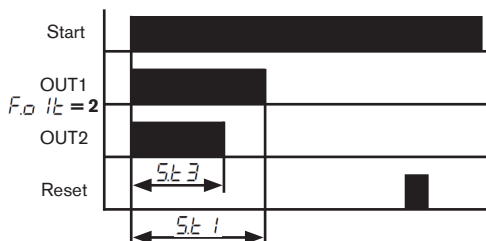


$F_{o2t} = 3$ **OUT2 Operates the same function as OUT1 but with S_{t3} time**

OUT2 operates exactly the same function as **OUT1** but whilst **OUT1** operates to time S_{t1} , **OUT2** operates to time S_{t3} . S_{t3} has the same time range as S_{t1} (9999h, 99h59m, 99m59s or 99.99s) and cannot be set to a value higher than S_{t1} .

If $F_{o1t} = 1, 4$ or 5 , **OUT2** operates a delay on energise function.

If $F_{o1t} = 2$ or 3 , **OUT2** operates a feed through function with a S_{t3} set time.

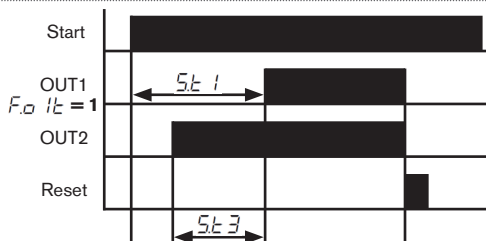
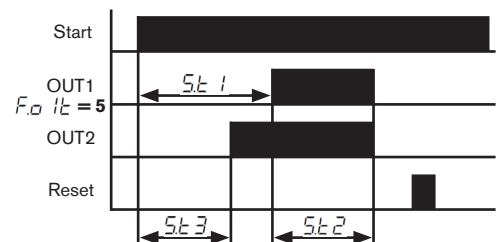
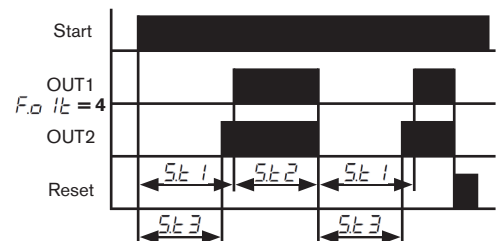
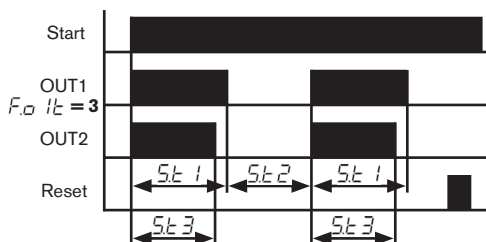


$F_{o2t} = 4$ **OUT2 Operates the same function as OUT1 but in advance by S_{t3} time**

OUT2 operates exactly the same function as **OUT1** but **OUT2** operates S_{t3} in advance of **OUT1**. S_{t3} has the same time range as S_{t1} (9999h, 99h59m, 99m59s or 99.99s) and cannot be set to value higher than S_{t1} .

If $F_{o1t} = 1, 4$ or 5 , **OUT2** operates a delay on energise function.

If $F_{o1t} = 2$ or 3 , **OUT2** operates a feed through function with a S_{t3} set time.

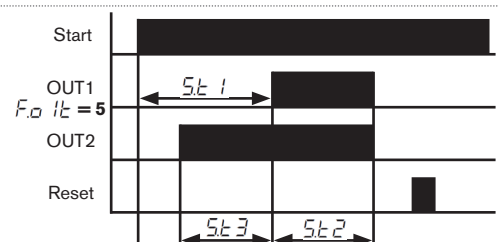
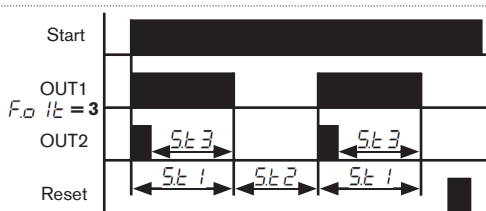
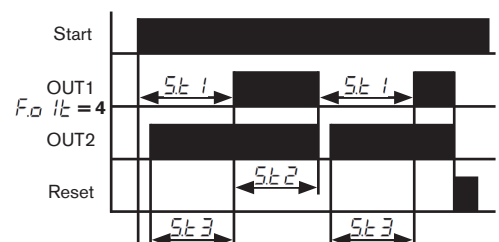
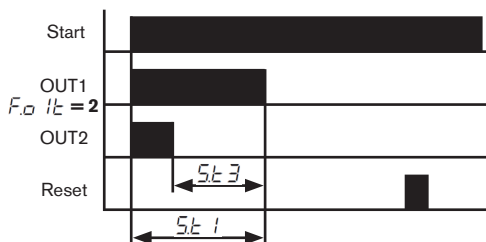


$F_{o2t} = 4$ **OUT2 Operates the same function as OUT1 but in advance by S_{t3} time**

OUT2 operates exactly the same function as **OUT1** but **OUT2** operates S_{t3} in advance of **OUT1**. S_{t3} has the same time range as S_{t1} (9999h, 99h59m, 99m59s or 99.99s) and cannot be set to value higher than S_{t1} .

If $F_{o1t} = 1, 4$ or 5 , **OUT2** operates a delay on energise function.

If $F_{o1t} = 2$ or 3 , **OUT2** operates a feed through function with a S_{t3} set time.








$F_{o2t} = 5$ **OUT2** energises when the buzzer sounds (with $F_{buF} = 2$) to manage an external sound/light signalling device.

OPERATION WITH A POWER SUPPLY INTERRUPTION

When the power supply to the timer is restored after an interruption the timing count can be programmed using the F_{buc} parameter to operate as follows:

- 1 The timing count resets.
- 2 The timing count stops at the value reached when the power supply ceased. The timing count continues once a new **Start** signal is activated.
- 3 The timing count stops at the value reached when the power supply ceased. When the power supply is restored the count restarts from that value if the conditions for restarting are present (e.g. the timer was counting within a bistable mode when the power supply ceased).

PROGRAMMABLE PARAMETERS

	Parameter	Description	Range	Default	Note
1	S_{Lt1}	S_{Lt1} Minimum set time	0 to S.Ht1	0	
2	S_{Ht1}	S_{Ht1} Maximum set time	S.Lt1 to 9999	99.59	
3	S_{Lt2}	S_{Lt2} Minimum set time	0 to S.Ht2	0.00	
4	S_{Ht2}	S_{Ht2} Maximum set time	S.Lt2 to 9999	99.59	
5	$SSt1$	S_{Lt1} Time range	1 hours (9999h) 2 hours & minutes (99h 59min) 3 minutes & seconds (99min 59s) 4 seconds (99.99s)	3	
6	$SSt2$	S_{Lt2} Time range	1 hours (9999h) 2 hours & minutes (99h 59min) 3 minutes & seconds (99min 59s) 4 seconds (99.99s)	3	
7	S_{t1}	S_{t1} Set time	S.Lt1 to S.Ht1	1.00	
8	S_{t2}	S_{t2} Set time	S.Lt2 to S.Ht2	0.00	
9	S_{t3}	S_{t3} Set time	S.Lt1 to S.Ht1	0.00	
10	iF_{ct}	CNT input operating mode	1 Bistable START/STOP 2 Bistable RESET-START/STOP 3 Monostable START/STOP 4 Monostable RESET-START/STOP 5 Bistable RESET/START/STOP 6 Bistable START/STOP-RESET	2	
11	F_{o1t}	OUT1 output operating mode	1 Delay on Energise (On Delay) 2 Interval 3 Immediate Cycle with Variable On and Off Times 4 Delayed Cycle with Variable On and Off Times 5 Single Delayed Cycle with Variable On and Off Times	1	
12	F_{o2t}	OUT2 output operating mode	oF OUT2 disabled 1 OUT2 operates exactly the same as OUT1 2 Instantaneous contact 3 OUT2 operates the same function as OUT1 but with S_{t3} time 4 OUT2 operates the same function as OUT1 but in advance by S_{t3} time 5 OUT2 energises when the buzzer sounds	oF	
13	F_{Cnt}	Count mode	uP Up dn Down	uP	
14	F_{buc}	Buzzer operating mode	oF Disabled 1 The internal buzzer activates at the end of S_{t1} for S_{t2} period and when keys are pressed 2 The internal buzzer activates at the end of S_{t1} for S_{t2} period 3 The internal buzzer only activates when keys are pressed 4 Only the external buzzer activates only at the end of S_{t1} for S_{t2} period (if OUT2 configured with $F_{o2t} = 5$).	1	
15	t_{UFT}	 -START/STOP key operating mode	oF No function 1 RESET only 2 RESET-START/STOP if $iF_{ct} = 1/2$ or RESET/START/STOP if $iF_{ct} = 5/6$	2	
16	t_{Edt}	Set times visible with fast set time procedure ( key)	oF No set time visibility 1 S_{t1} 2 S_{t2} 3 S_{t1} and S_{t2} 4 S_{t3} 5 S_{t1} and S_{t3} 6 S_{t2} and S_{t3} 7 S_{t1} , S_{t2} and S_{t3} 8 S_{t1} only directly with the  /  keys with no  key pressed	1	
17	F_{buc}	Backup operation mode	1 The timing count resets 2 The timing count stops at the value reached when the power supply ceased 3 The timing count stops at the value reached when the power supply ceased and restarts from that value if the conditions for restarting are present	1	
18	$EndC$	Display to flash at count end	0 Display flashes at count end 1 Display steadily ON at count end	0	
19	r_{out}	Output relay exchange	1-2 Operation F_{o1t} on OUT1, F_{o2t} on OUT2 2-1 Operation F_{o1t} on OUT2, F_{o2t} on OUT1	1-2	
20	t_{Lo}	Key lock	oF Key lock disabled 1 to 9999s (value in seconds of key inactivity after which the keys are locked)	oF	
21	t_{PP}	Passcode for parameters protection	oF Passcode disabled 1 to 9999	oF	

Tempatron: Eltime House, Hall Road, Maldon, Essex, CM9 4NF UK.

Telephone: +44(0)1621 859500 Fax: +44(0)1621 855335 Email: sales@tempatron.co.uk Web: www.tempatron.co.uk

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