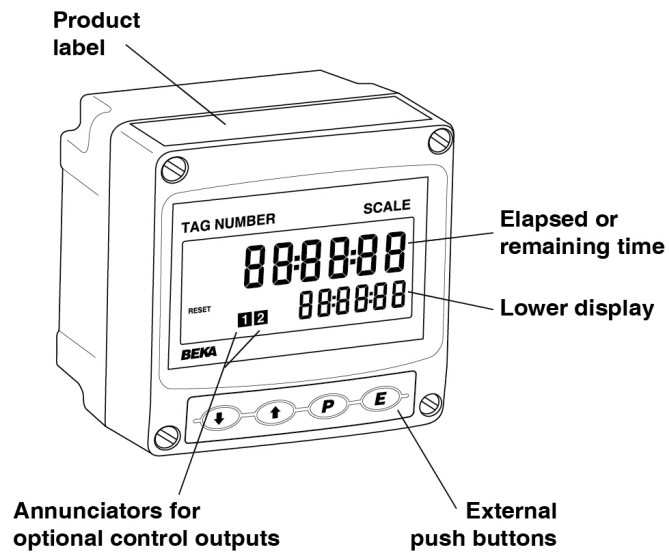


BA574G
Two input
General Purpose
Timer or Clock
Issue 4



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1. DESCRIPTION

The BA574G is a general purpose, field mounting instrument with two inputs that can be configured on-site as a Timer or as a Clock.

As a Timer the BA574G can measure and display the elapsed time between external events, or control external events via the status output or the control outputs.

When configured as a Clock, the BA574G can display time in a variety of formats and the control outputs may be configured to turn *on* and *off* at pre-set times.

This instruction manual is divided into three sections.

Common features

2. System design
3. Installations
4. Accessories

Timer

5. Operation as a timer
6. Timer application example
7. Maintenance

Clock

8. Operation as a clock
9. Clock configuration example
10. Maintenance

This instruction manual supplements the abbreviated instruction sheet supplied with each instrument.

2. SYSTEM DESIGN

Fig 1 illustrates the basic circuit that is used for all BA574G Timer installations. Clock installations are the same except the two inputs A and b are not used.

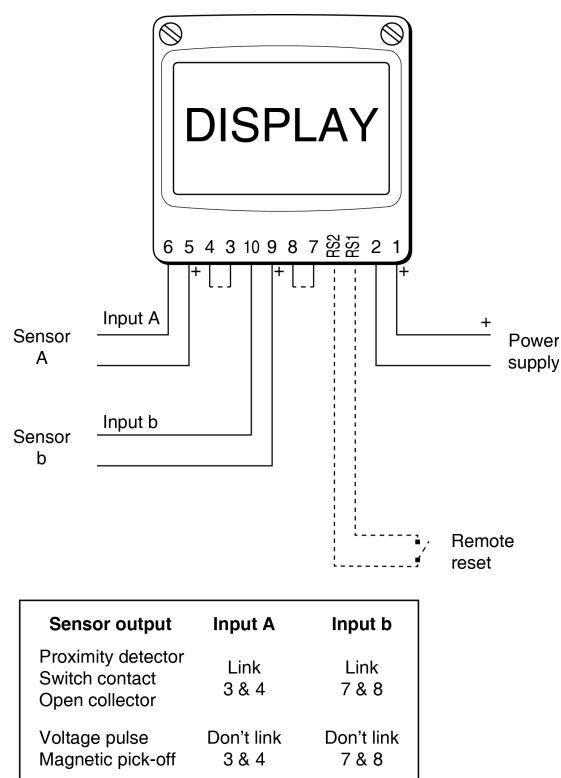


Fig 1 Basic BA574G System

When designing a BA574G Timer or Clock system it is important to remember that terminals 2, 6, 10 and RS2 are interconnected within the instrument. See Fig 8.

2.1 Power supply

The BA574G Timer or Clock requires a minimum of 10V dc between terminal 1 & 2 and consumes:

	10mA	without optional backlight
plus	6mA	when terminals 3 & 4 are linked
plus	6mA	when terminals 7 & 8 are linked
plus	16mA	with optional backlight

A 24V dc regulated, current limited supply is suitable.

2.2 Sensor inputs

When configured as a Timer both inputs may be connected to a wide variety of sensors as shown in Fig 2. The two BA574G inputs are not used when the instrument is configured as a Clock.

2.2.1 Input switching thresholds

For reliable operation as a Timer the BA574G sensor inputs must fall below the lower threshold and rise above the upper thresholds shown in the following table.

Input transducer	Switching thresholds	
	Lower	Upper
Open collector	2k Ω	10k Ω
Voltage pulse low	1.0V	3.0V
Voltage pulse high	3.0V	10.0V
Magnetic pick-off	0mV	40mV peak
Proximity detector	1.2mA	2.1mA
Switch	100 Ω	1000 Ω

Switch contact, proximity detector and open collector sensors require energising to detect their state which is achieved by linking BA574G terminals 3 and 4 for input A and terminals 7 and 8 for input b.

2.2.2 Switch contact input

Any switch contact may be directly connected to pulse input terminals 5 and 6 and to terminals 7 and 8. The BA574G contains a configurable debounce circuit to prevent contact bounce being counted. See section 5.5.6.

2.2.3 Open collector input

Sensors with an open collector output may be directly connected to input terminals 5 and 6 and to terminals 7 and 8. Sensor polarity should be observed. The BA574G contains a configurable debounce circuit to prevent false triggering. See section 5.5.6.

2.2.4 2-wire proximity detector input

Most NAMUR 2-wire proximity detectors may be directly connected to a BA574G input terminals 5 and 6 and to terminals 7 and 8 providing the minimum operating voltage of the proximitor is less than 7.5V. The proximitor polarity should be observed. The BA574G contains a configurable debounce circuit to prevent false triggering. See section 5.5.6.

2.2.5 Magnetic pick-off input

Sensors incorporating a magnetic pick-off will usually have a low level ac voltage output which a BA574G can sense when configured for a $\square$ input. The BA574G contains a configurable debounce circuit to prevent false triggering. See section 5.5.6.

2.2.6 Voltage pulse input

Two voltage pulse input ranges $U_{0L\leq 5L}$ and $U_{0L\leq 5H}$ are selectable in the configuration menu for each BA574G input. Any voltage output sensor may be used. The BA574G contains a configurable debounce circuit to prevent false triggering. See section 5.5.6.

2.3 Remote reset

Connecting the external reset terminals RS1 and RS2 together will reset the BA574G when configured as a Timer and synchronise the displayed time to a preset time when configured as a Clock.

Remote resetting may be accomplished by any switch. Fig 1 illustrates how a BA574G may be remotely reset.

Note: When used as a Timer the BA574G may also be reset from the display mode by operating the  and  push buttons simultaneously for more than three seconds. See 5.5.20

2.4 Status output

The BA574G Timer or Clock has an opto-isolated open collector output which can be configured to indicate the status of the instrument, or to perform simple control functions. The output has the following electrical parameters:

V max	=	30V dc
I _{max}	=	10mA
R _{on}	=	60 Ω + 3V
R _{off}	=	1M Ω

The status output may be connected to any dc circuit providing that the maximum supply voltage is not greater than 30V dc and the maximum current is not greater than 10mA. It can therefore be directly connected to most instruments with an open collector input.

If a voltage status output is required, Fig 2 shows how this can be produced using an external resistor R1. When the status output is activated current flows through R1 resulting in a voltage output of about 20V.

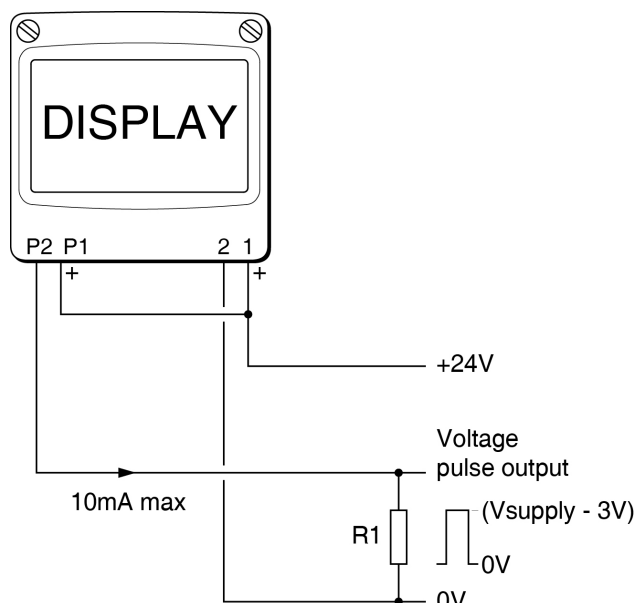


Fig 2 Producing a status output voltage .

2.5 Control outputs

Each of the two control outputs is a galvanically isolated single pole solid state switch as shown in Fig 3. The outputs are polarised and current will only flow in one direction. Terminals A1 and A3 should be connected to the positive side of the supply.

$$\begin{aligned} R_{on} &= \text{less than } 5\Omega + 0.7V \\ R_{off} &= \text{greater than } 1M\Omega \end{aligned}$$

Note: Because of the series protection diode some test meters may not detect a closed alarm output.

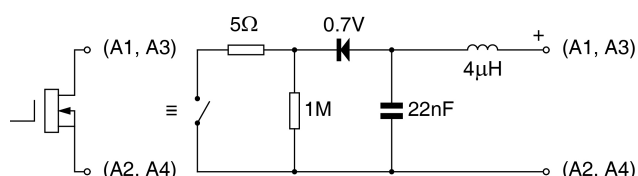


Fig 3 Equivalent circuit of each control output

Each control output is a galvanically isolated single pole solid state switch as shown in Fig 3. The outputs are polarised and current will only flow in one direction. Terminals A1 and A3 should be connected to the positive side of the supply.

$$\begin{aligned} R_{on} &= \text{less than } 5\Omega + 0.7V \\ R_{off} &= \text{greater than } 1M\Omega \end{aligned}$$

Each control output may be used to switch any dc circuit with parameters equal or less than:

$$\begin{aligned} V &= 30V \text{ dc} \\ I &= 200mA \end{aligned}$$

Note: Because of the series protection diode some test meters may not detect a closed alarm output

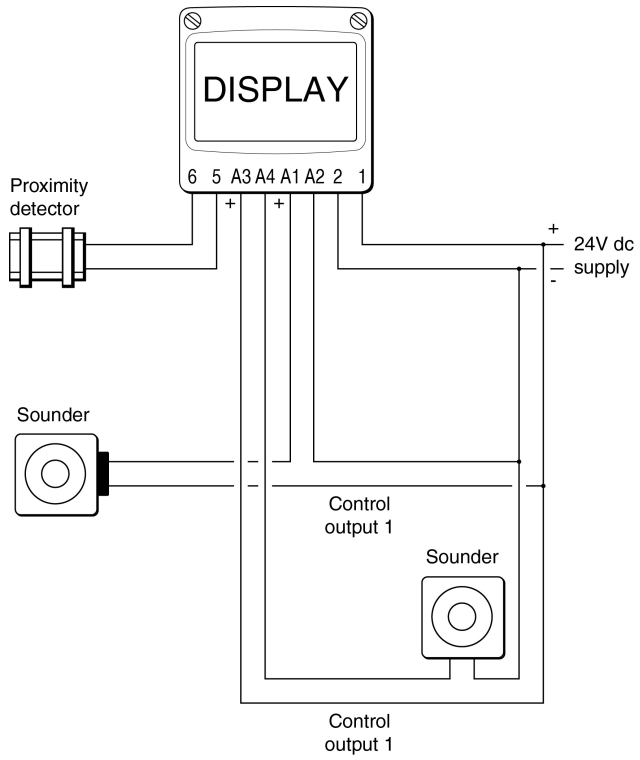


Fig 4 Typical control output application
(Shown without recommended screened cables)

3. INSTALLATION

3.1 Location

The BA574G Timer or Clock is housed in robust IP66 glass reinforced polyester (GRP) enclosure incorporating an armoured glass window and stainless steel fittings making it suitable for exterior mounting in most industrial on-shore and off-shore installations. The Timer or Clock should be positioned where the display is not in continuous direct sunlight.

Field wiring terminals are located on the rear of the Timer or Clock assembly as shown in Fig 6.

To ensure electrical continuity between the two conduit or cable entries, the enclosure back-box is fitted with a bonding plate which includes an M4 earth stud. The bonding plate may be mounted on the inside or outside of the enclosure. If the carbon loaded GRP enclosure is not bolted to an earthed post or structure, this earth stud should be connected to a local earth or the plant potential equalising conductor.

An insulated M4 stud is provided in the bottom right hand corner of the back-box for interconnecting cable screens.

The BA574G Timer or Clock may be pipe mounted using a BA393G pipe mounting kit or panel mounted using a BA394G or BA395G kit all of which are available as accessories.

3.2 Installation Procedure

Fig 5 illustrates the instrument installation procedure.

- A. Remove the Timer or Clock assembly by unscrewing the four captive 'A' screws.
- B. Mount the enclosure back-box on a flat surface and secure with screws or bolts through the four 'B' holes. Alternatively use the pipe mounting kit which is available as an accessory.
- C. Remove the temporary hole plug and install an appropriate IP and temperature rated M20 x 1.5mm certified cable gland or conduit fitting. If two entries are required, the supplied IP66 stopping plug should be replaced with an appropriate IP and temperature rated M20 x 1.5mm certified cable gland or conduit fitting.
- D. Feed the field wiring through the cable entry in the back-box and connect it to the instrument terminals as shown in Fig 6. Replace the instrument assembly on the back-box and evenly tighten the four 'A' screws.

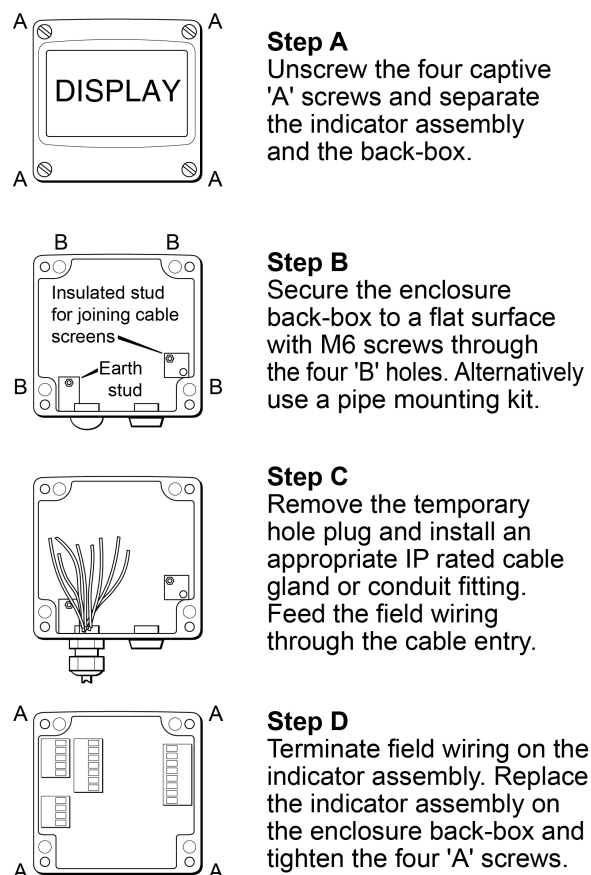


Fig 5 BA574G installation procedure

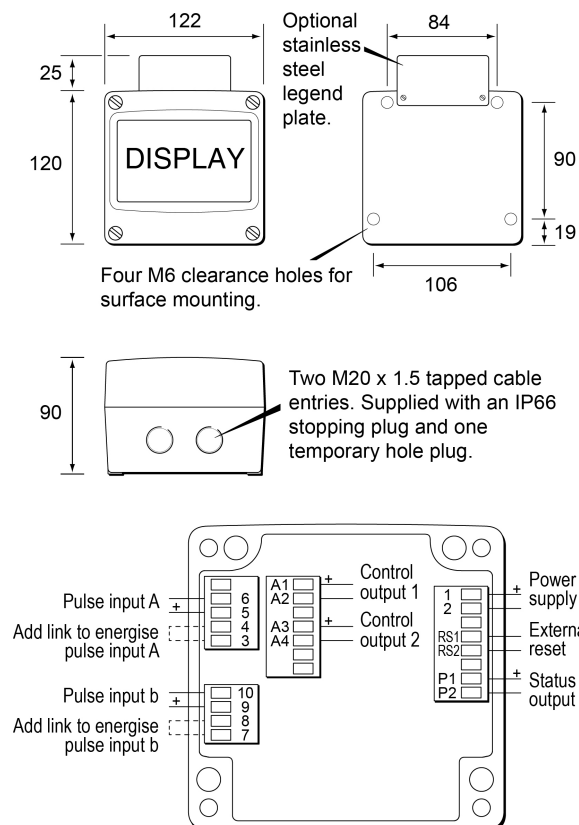


Fig 6 Dimensions and terminal connections

3.3 EMC

The BA574G complies with the requirements of the European EMC Directive 2014/30/EU and UK Electromagnetic Compatibility Regulations UKSI 2016:1091 (as amended). For specified immunity all wiring should be in screened twisted pairs, with the screens earthed at one point.

3.4 Units of measurement and tag marking on scale card.

The Timer or Clock's units of measurement and tag information are shown on a scale card which slides into the instrument.

New Timer or Clocks are supplied with a printed scale card showing the requested units of measurement and tag information. If this information is not supplied when the instrument is ordered, a blank scale card will be fitted which can easily be marked on-site with a dry transfer or a permanent marker. Custom printed scale cards are available from BEKA associates as an accessory.

To remove the scale card from a Timer or Clock carefully pull the transparent tab at the rear of the instrument assembly away from the assembly as shown in Fig 7a.

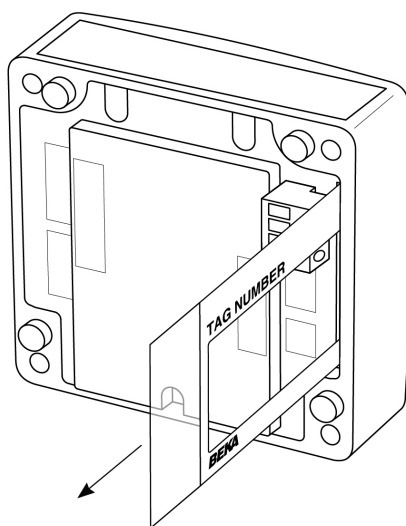


Fig 7a Removing scale card

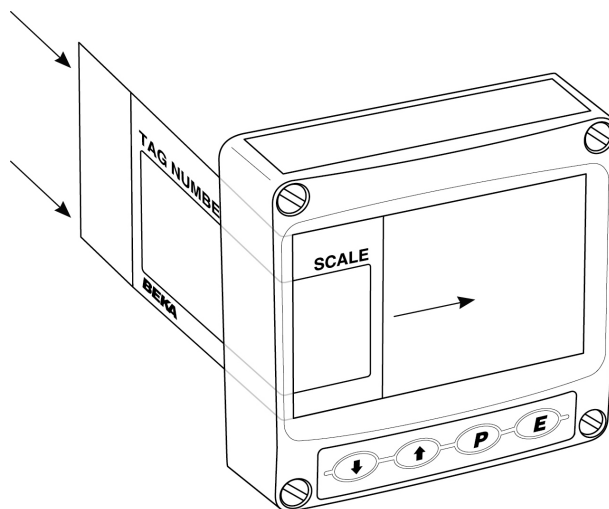


Fig 7b Inserting scale card into the instrument assembly.

To replace the scale card carefully insert it into the slot on the right hand side of the input terminals as shown in Fig 7b. Force should be applied evenly to both sides of the scale card to prevent it twisting. The card should be inserted until about 2mm of the transparent tab remains protruding.

4. ACCESSORIES

4.1 Display backlight

The BA574G Timer or Clock can be supplied with a factory fitted backlight that produces green illumination enhancing display contrast and enabling it to be read at night or in poor lighting conditions. The backlight is internally powered from the instrument power supply so no additional wiring is required, but the supply current increases as shown below.

BA574G configured as Timer current consumption	
BA574G Timer or Clock	10mA
Additional for backlight	16mA
Addition with terminals 3 & 4 linked	6mA
Addition with terminals 7 & 8 linked	6mA

Total current	38mA max

BA574G configured as Clock current consumption	
BA574G Timer or Clock	10mA
Additional for backlight	16mA

Total current	26mA max

4.2 Control outputs

BA574G Timer or Clocks despatched by BEKA associates before 1st January 2025 were only fitted with control outputs when requested by the purchaser.

Control outputs are no longer considered an accessory. All BA574G Timer or Clocks despatched by BEKA associates after 1st January 2025 are fitted with two control outputs.

4.3 Scale card

New BA574G Timer or Clocks are supplied with a printed scale card showing the units of measurement and tag information specified when the instrument was ordered. If this information was not supplied a blank scale card will be fitted which can easily be marked with a dry transfer or a permanent marker on-site.

Custom printed scale cards are available as accessories and may be easily fitted as shown in section 3.4 of this manual.

4.4 Legend plate

The BA574G can also be supplied with a blank or custom laser engraved stainless steel legend plate - see Fig 6. The plate, which after installation is visible from the front of the instrument, is supplied loose with two fixing screws for securing it to the rear of the instrument's back-box. This plate can typically accommodate:

1 row of 5 alphanumeric characters 10mm high

or 1 row of 6 alphanumeric characters 7mm high

or 2 rows of 10 alphanumeric characters 5mm high

4.5 BA393G pipe mounting kit

316 stainless steel pipe mounting kit, attaches a BA574G to any vertical or horizontal pipe with an outside diameter between 40 and 73mm.

4.6 BA394G panel mounting kit

The BA574G may be panel mounted using a BA394G stainless steel panel mounting kit. This secures the BA574G into a panel aperture and maintains the ingress protection of the instrument, but it does not provide an IP66 seal between the front and rear of the panel in which the BA574G Timer or Clock is mounted.

4.7 BA494G panel mounting kit

The BA574G may be panel mounted using a BA494G GRP panel mounting kit. This secures the BA574G into a panel aperture, maintains the ingress protection of the instrument and provides an IP66 seal between the front and rear of the panel.

The BA494G kit has a UKAS registered test house certificate confirming that it maintains the IP66 ingress protection of the BA574G, and provides an IP66 seal between the front and rear of the panel enclosure.

5. OPERATION AS A TIMER

When configured as a Timer the BA574G can measure and display the elapsed time between external events. The Timer can be started and stopped by remote sensors, or from the front panel push buttons.

The two isolated control outputs allow the Timer to control external events such as opening a valve for a predetermined time. Again the Timer can be started and stopped by remote sensors, or from the front panel push buttons. Timed events can be repeated using the $\square Y \square \square \square$ function which enables the BA574G Timer to repeat the timing period up to 99 times, or continuously, with a configurable delay between timed periods of up to 100 hours.

The BA574G may be configured to time-up from zero to the set time $5E \pm \square$, or to time-down from the set time to zero. Times may be entered and displayed in hours, minutes or in seconds, or in a combination of units. Elapsed or remaining time is continuously displayed and a separate display may be activated to show the target set time $5E \pm \square$. Throughout the timing cycle the instrument can be paused and restarted without changing the cycle time. Resetting is accomplished via the front panel push buttons or a remote contact.

A grand total time is maintained by the instrument which can be viewed by operating the front panel push buttons and reset from the display mode or from within the configuration menu.

Fig 8 shows a simplified block diagram of the BA574G when configured as a Timer. The two separate inputs A and b can be individually configured to accept inputs from a wide variety of sensors. When the sensor requires energising to detect its state, such as a switch contact, open collector or a two wire proximity detector, a link connected between external terminals of the BA574G supplies power to the sensor input terminals.

The optically isolated status control output is a current sink intended for monitoring the Timer's status, but may also be used for simple control applications.

For use in poorly illuminated areas the instrument can be supplied with an internally powered backlight.

5.1 Initialisation

Each time power is applied to a BA574G initialisation is performed. After a short delay the following display sequence occurs:

All segments of the display are activated

BA574G is ready to start functioning using the configuration information stored in the instrument's permanent memory.

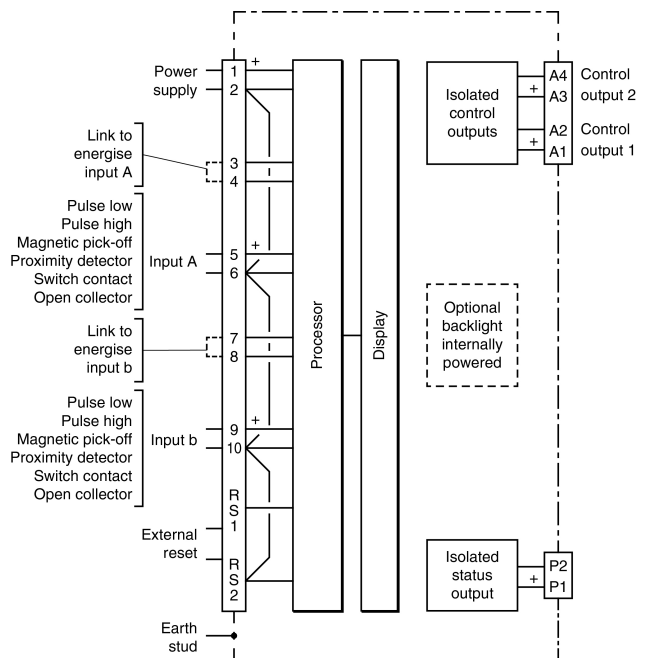


Fig 8 BA574G block diagram with Timer configuration.

5.2 Controls when configured as a Timer

The BA574G is controlled and configured via four front panel push buttons. In the display mode i.e. when the instrument is timing the push button functions are:

Push Button Functions

-  When local control is enabled starts the Timer. See 5.5.9
-  When local control is enabled stops the Timer. See 5.5.9
-  +  Shows the grand total (run time) in hours and tenths of an hour irrespective of Timer configuration. If buttons are held for longer than ten seconds the grand total may be reset to zero if the grand total reset sub-function *GLR GLt* is enabled in the *LoC rSEt* configuration function. See 5.5.21
- If *GLR GLt* is enabled the grand total can be reset to zero from the display mode by pressing the  and  buttons simultaneously for ten seconds until *GLR na* is displayed. Changing the display to *GLR YE5* using the  or  button and pressing  will then reset the grand total to zero.
-  +  Resets the Timer to zero or to the set time *SEt t* depending on whether the Timer is configured to *time-up* or *time-down* when the two buttons are operated simultaneously for more than two seconds. This is a configurable function. See 5.5.20
-  +  When enabled in the configuration menu, operating these two buttons simultaneously provides direct access from the display mode to the set time *SEt t* and, if the repeat timing cycle is enabled, to the restart delay *rSEt dELR*. See 5.5.16
-  +  Shows in succession, firmware version number, instrument function *ELRP5E* and confirms that control outputs are fitted:
 - R Dual control outputs
 - P Status output (*Always fitted*)
-  +  Accesses the configuration menu

5.3 Displays when configured as a Timer

The BA574G has two digital displays and associated annunciators as shown on front cover of this manual.

Elapsed time

The upper display shows the elapsed time since the Timer was started when *timing-up from zero* and the remaining time when *timing-down* from the set time. Display may be formatted as hh:mm:ss; hh:mm; mm:ss or ss.

Lower display

The display options available on the lower display depend on whether the Timer repeat cycle function *YCLE5*, which can repeat the timing period up to 99 times with a configurable delay between periods, is enabled.

YCLE5 disabled

The lower display shows the set time *SEt t* or the lower display may be disabled if not required. See 5.5.8

YCLE5 enabled

The lower display shows the total number of repeat cycles requested together with the number of the current cycle. Each operation may be briefly named at it's start or periodically throughout the cycle. Alternatively the lower display may be disabled if not required. See 5.5.8

Reset annunciator

Activated while elapsed time is being reset to zero or to the set time *SEt t*.

Status output annunciator

RTx shown while status output is activated.

Grand total annunciator

Activated when the grand total time is being shown on the upper display.

Control output annunciators 1 and 2.

Shows status of both control outputs.

5.4 Timer structure

Fig 9 illustrates the Timer structure and function as a state diagram. It applies when the instrument is measuring the time between events or is controlling external events.

The circles in Fig 9 represent the five Timer states, *Reset*, *Running*, *Restart-delay*, *Paused* and *Complete*. The lines between the circles represent the event required to move the Timer between states. e.g. to initiate timing the Timer is moved from the *Reset* state to the *Running* state by a start event. This could be an input signal at input A or operation of the  button. Similarly, to pause the Timer while it is timing, the Timer must be moved from the *Running* state to the *Pause* state by a stop event which could be an input on input b or operation of the  button.

Reset

In this state the Timer is readied for operation. The Timer is stopped and loaded with zero for timing-up or 5Et t for timing-down.

Running

Entered by a start event from the *Reset* or *Paused* states. The Timer times-up to 5Et t or times-down to zero depending upon its configuration.

Pause

Entered by a stop event from *Running* or *Restart-delay*. Timer is stopped, a start event returns the timer to its previous state.

Restart-delay

Entered automatically from *Running*. At the end of the delay time automatically returns to *Running*.

Complete

Entered automatically from *Running* when there are no more timing cycles to perform.

5.5 Configuration as a Timer

The BA574G is configured via the four front panel push buttons. All the configuration functions are contained in an easy to use intuitive menu that is shown diagrammatically in Fig 10.

Each menu function is summarised in section 6.5.2 of this manual and each summary includes a reference to more detailed information.

All new BA574G instruments are supplied configured as requested at the time of ordering. If configuration is not requested, the BA574G will be supplied with default Timer configuration as shown below, but the instrument can easily be re-configured on-site.

Function	Display	Default
Access code	[odE	0000
Function	Funct, on	ELAPSE
Input A	, nPut -A	oP.CoL
Input b	, nPut -b	oP.CoL
Debounce (each input)	dEbounCE	dEFRAULt
Display 2	d, SP-2	5td
Start stop	StArStoP	LoCARL
Units	un, tS	12:00:00
Set time	5Et t	00:00:00
Enable repeat cycle	[YCLE5	oFF
Access set time from display mode.	ACSEt t	oFF
Direction of count	uP or dn	dn
Recovery from power supply failure.	P-FRL	, dLE
Local total reset	t-rESEt	on
Local grand total reset	Gt-rESEt	oFF
External reset	E-rESEt	5td
Enable status output	EnbL	oFF
Enable control output 1	EnbL	oFF
Enable control output 2	EnbL	oFF

When the [YCLE5 function is enabled the timing cycle can be specified to repeat up to 99 times, or can be configured to repeat continuously.

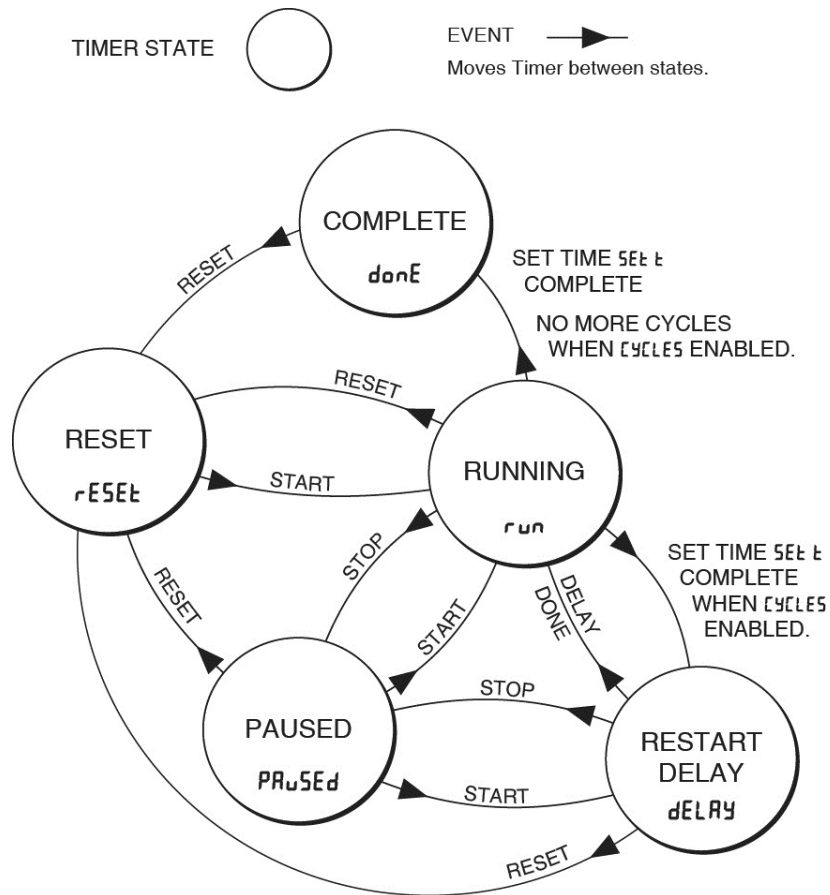


Fig 9 Timer structure showing states and events

5.5.1 Accessing configuration functions

Throughout this manual front panel push buttons are shown as , ,  and . Legends displayed by the instrument are shown in a seven segment font just as they appear on the instrument e.g.  and .

Access to the configuration menu is obtained by operating the  and  push buttons simultaneously. If the instrument is not protected by an access security code the first parameter *Function* will be displayed.

If a security code other than the default code  has already been entered, the instrument will display . Press  to clear this prompt and enter the security code for the instrument using the  or  push button to adjust the flashing digit and the  push button to transfer control to the next digit. If the correct code has been entered pressing  will cause the first parameter *Function* to be displayed.

If an incorrect code is entered, or a push button is not operated within ten seconds, the instrument will automatically return to the display mode.

All configuration functions and prompts are shown on the upper eight digit display.

Once within the main configuration menu the required parameter can be selected by scrolling through the menu using the  or  push buttons. The Timer configuration menu is shown diagrammatically in Fig 10.

When returning to the display mode following reconfiguration, the Timer will display *done* followed by *done* while the new information is stored in permanent memory.

5.5.2 Summary of Timer configuration functions

This section summarises all the Timer configuration functions. When read in conjunction with Fig 10 it provides a quick aid for configuring the Timer. If more detail is required, each section of this summary contains a reference to a full description of the function.

Display	Summary of function
Function	Instrument function Defines the function of the instrument. May be set to: ELAPSE Timer configuration Clock Clock configuration All the entries in this Timer summary assume that the BA574G is configured as a Timer by selecting ELAPSE. See section 5.5.3
Input-A	Configuration of Input A Contains a sub-menu with two sub-functions: InputYPE Selects input sensor type deBOUNCE Defines input debounce See section 5.5.4 InputYPE Configures the Timer sensor Input A to accept one of six types of input: Voltage L Voltage pulse <1 >3V Voltage H Voltage pulse <3 >10V Magnetic Magnetic pick-off Prox.dETE Proximity detector * Switch Switch contact * Open.col Open collector * * Energise input by linking terminals 3 & 4 for Input A. See section 5.5.5 deBOUNCE Defines the level of input debounce applied to the input A to prevent false counting: default HERBY L, GH See section 5.5.6

Display

Summary of function

Input b

Configuration of input-b

As configuration of Input A

* Energise input by linking terminals 7 & 8 for Input b.

See section 5.5.7

SP-2

Lower display

Configures the lower display to show set time SEt or, when the CYCLE5 repeat function is activated, the restart delay count-down plus the cycle count number.

With CYCLE5 not enabled:

Select

Lower display shows

SEt

Set time SEt

OFF

Disables lower display.

See section 5.5.8

With CYCLE5 enabled:

Select

Lower display shows

SEt

Cycle counts requested and counts performed with time-down shown during requested delay period. Brief notification of timer status i.e. CYCLE or DELAY at start of each period.

LABEL

Exactly as SEt but with periodic notification of timer status i.e. CYCLE or DELAY.

OFF

Disables lower display.

See section 5.5.8

START-STOP

Starting and stopping the timer

Defines how the Timer is started and stopped.

Start

Stop

Control 1

A input high

b input high

Control 2

A input low

b input low

Control 3

A input high

A input low

Control 4

A input low

A input high

Label

▼ button

▲ button

High and low inputs are specified for a voltage input. For other types of sensor input, see section 5.5.9

Display	Summary of function
unr t5	Units of display Enables the format of the displayed time to be selected. 12:00:00 Hours, minutes & seconds 12:00 Hours & minutes 30:00 Minutes & seconds 30 Seconds Excludes delay of control outputs which is always shown in seconds and the grand total which is always shown in hours. See section 5.5.10
5Et t	Set time This is the BA574G Timer's setpoint. When controlling an external event via the control outputs the BA574G will time-down from the set time to zero or time-up from zero to the set time. Note: Timer will only start if a non zero value is entered for set time 5Et t. See section 5.5.11
CYCLE5	Repeat timing cycle Contains a sub-menu with three sub-functions, EnbL, CYCL Cnt and r5t dELR. See section 5.5.12 Cycle function enable EnbL Enables or disables the cycles function without changing the parameters. See section 5.5.13 Cycle count CYCL Cnt Defines the number of times that the timer cycle is repeated. See section 5.5.14 Restart delay r5t dELR Defines the time delay between timer cycles. See section 5.5.15
RC5Et t	Adjusting 5Et t from display mode Contains two sub-functions, EnbL which when activated allows the set time 5Et t and restart delay r5t dELR to be adjusted from the display mode. The second sub-function RCCLd defines a separate access code to protect access to 5Et t from the display mode. See section 5.5.16

Display	Summary of function
uP or dn	Direction of count Defines whether the Timer times-up from zero to the set time 5Et t, or times-down from 5Et t to zero. See section 5.5.17
P-FR, L	Power Failure Defines how the Timer functions when power is restored after a power failure. Contains three alternative options, dLE, PRu5E and Cnt, nuE. Idle dLE Timer returns in stopped state as if having completed single timing cycle displaying Timer value when power was lost. Timing resumes when reset followed by start instructions are received. Pause PRu5E Timer returns in paused state displaying Timer value when power was lost. Timing resumes when start instruction is received. Continue Cnt, nuE Timer will continue without any manual intervention. See section 5.5.18
LdC r5Et	Local reset Contains two sub-functions which when enabled allow the Timer and the grand total, which represents total Timer run-time, to be reset to zero via the front panel push buttons while the Timer is in the display mode. See section 5.5.19 Local total reset r5Et.EnbL When on is selected, Timer is reset to zero, or 5Et t if timing-down, when the  and  buttons are operated simultaneously for more than 2 seconds in the display mode. See section 5.5.20 Local grand total reset CLr Gtnt When on is selected the grand total, which represents total run-time, may be reset to zero by operating the  and  buttons simultaneously for more than 10 seconds in the display mode. See section 5.5.21

Display	Summary of function	Display	Summary of function
E-r5Et	External reset Defines the time taken for closure of external contacts connected to terminals RS1 & RS2 to reset the Timer. St d 1s FRSt 2ms See section 5.5.22		Control output 1 on aP I on Control output 1 turns <i>on</i> when the Timer enters the state selected in this function. Output phase can be reversed. See section 5.5.30
5tRt aP	Status output Contains sub-menu with four sub-functions, EnbL, 5tRt on, 5tRt oFF and 5tRtdELR Note: Output is a passive open collector. See section 5.5.23 Status output enable EnbL Enables or disables the status output without changing any of the parameters. See section 5.5.24 Status output on 5tRt on Status output turns <i>on</i> when the Timer enters the state selected in this function. Output phase can be reversed. See section 5.5.25 Status output off 5tRt oFF Status output turns <i>off</i> when the Timer enters the state selected in this function. Output phase can be reversed. See section 5.5.26 Status on delay 5tRtdELR Introduces a specified delay between the <i>on</i> condition occurring and the status output being activated. See section 5.5.27	aP2	Control output 1 off aP I oFF Control output 1 turns <i>off</i> when the Timer enters the state selected in this function. Output phase can be reversed. See section 5.5.31 Control output on delay aP I dELR Introduces a specified delay between the on condition occurring and control output 1 closing. See section 5.5.32
aP I	Control output 1 aP I Contains sub-menu with four sub-functions, EnbL, aP I on, aP I oFF and aP I dELR. See section 5.5.28 Control output 1 enable EnbL Enables or disables control output 1 without changing the parameters. See section 5.5.29	[Lr Gtob	Control output 2 aP2 Functions as control output 1. See section 5.5.28 to 5.5.32 Resets grand total from within configuration menu. This function resets the grand total, which represents the total Timer run-time, from within the configuration menu when [Lr yE5 is selected and SurE is entered to confirm the instruction. Note: Once reset, the grand total can not be recovered. See section 5.5.34
		[odE	Security code Defines a four digit alphanumeric code that must be entered to gain access to the instrument's configuration menu. Default code 0000 disables the security function and allows unrestricted access to all configuration functions when the [P] and [E] buttons are operated simultaneously in the display mode. See section 5.5.35
		r5Et dEF	Reset to factory defaults Resets the BA574G to the Timer factory default configuration shown in section 5.4 Instruction confirmed by entering SurE. See section 5.5.36

5.5.3 Instrument function: *Functi on*

The BA574G may be configured as a Timer or as a Clock. This section of the instruction manual describes the Timer, for details of Clock configuration see section 8.

To reveal the existing function of the instrument select *Functi on* from the configuration menu and press **[P]**. If *ELAPSE* is displayed, the instrument is already configured as a Timer therefore press **[E]** to return to the *Functi on* prompt in the configuration menu. If *CLock* is displayed, press the **[▲]** or **[▼]** button to change the setting to *ELAPSE* followed by the **[P]** button which will result in a *0000* prompt being displayed with the first digit flashing. This is a request for the instruction to be confirmed by entering *SurE* using the **[▼]** or **[▲]** button to adjust the flashing digit and the **[P]** button to move control to the next digit. When *SurE* has been entered, pressing **[E]** will change the instrument to a Timer and return the instrument to the display mode. To configure the Timer enter the configuration menu by pressing the **[P]** and **[E]** buttons simultaneously until *Functi on* is displayed.

5.5.4 Input A: *i nPut-A*

The *i nPut-A* function contains two sub-functions *i nPUTYPE* which defines the type of sensor that may be connected to the input and *dEBounce* which adjust the amount of input noise rejection.

5.5.5 Input type: *i nPUTYPE*

i nPUTYPE is a sub-menu in the *i nPut-A* function which defines the type of input sensor that may be connected to input A. To check or change the type of input, select *i nPut-A* in the configuration menu and press **[P]** which will reveal the *i nPUTYPE* prompt, pressing **[P]** again will show the existing input. If set as required press **[E]** twice to return to the configuration menu, or repeatedly press the **[▲]** or **[▼]** button until the required type of input is displayed, then press **[E]** twice to return to the configuration menu.

One of following six types of input may be selected:

Display	Input type	Switching thresholds	
		Low	High
<i>oPCol</i>	Open collector ²	2	10kΩ
<i>Volts L</i>	Voltage pulse low ¹	1	3V
<i>Volts H</i>	Voltage pulse high ¹	3	10V
<i>Mag L</i>	Magnetic pick-off	0	40mV
<i>Prox det</i>	Proximity detector ²	1.2	2.1mA
<i>Switch</i>	Switch contact ²	100	1000Ω

Notes:

1. Maximum voltage input +30V.
2. For sensors connected to input A that require energising i.e. a proximity detector, a switch contact or an open collector, terminals 3 & 4 of the BA574G Timer should be linked together.
3. To function correctly, the input signal must fall below the lower switching threshold and rise above the higher switching threshold.

5.5.6 De-bounce: *dEBounce*

dEBounce is an adjustable sub-menu in the *i nPut-A* function which prevents the Timer mis-functioning when the input has noisy edges, such as those resulting from a mechanical contact closing and bouncing. Three levels of protection may be selected and the amount of debounce applied depends upon the type of Timer input that has been selected in the *i nPUTYPE* function.

The following table shows the minimum time that the input signal must be continuously above the upper input switching threshold and continuously below the lower switching threshold to ensure that the Timer processes the input signal. Input switching thresholds are shown in section 5.5.5.

De-bounce level	Min input pulse width	
	Contact	All others
<i>default</i>	1600μs	40μs
<i>HEAVY</i>	3200μs	350μs
<i>Light</i>	400μs	5μs

5.5.7 Input b: *i nPut-b*

The *i nPut-b* function and sub-functions are identical to the *i nPut-A* function & sub-functions described in sections 5.5.4, 5.5.5 and 5.5.6.

Notes:

1. Maximum voltage input +30V.
2. For sensors connected to input b that require energising i.e. a proximity detector, a switch contact or an open collector, terminals 7 & 8 of the BA574G Timer should be linked together.
3. To function correctly, the input signal must fall below the lower switching threshold and rise above the higher switching threshold.

5.5.8 Lower display: $d, 5P-2$

The configuration options for the lower display vary depending upon whether the repeat timer function CYCLE5 is enabled.

CYCLE5 disabled

When the lower display is enabled it shows the set time $5Et\ t$

CYCLE5 enabled

When the lower display is enabled it shows the total number of repeat cycles requested together with the number of cycles performed. During the delay time between cycles the display shows the time until the next cycle starts.

Menu options allow each part of the cycle to be briefly identified at the start of each part, or periodically throughout the cycle.

To check or change the configuration of the lower display select $d, 5P-2$ from the configuration menu and press P which will reveal the existing setting which can be changed by pressing the $\blacktriangle$ or $\blacktriangledown$ button followed by the E button to enter the selection and return to the configuration menu.

If the CYCLE5 function is not enabled the following two options are available:

5Ed Lower display shows the Timer's set time $5Et\ t$, to which the BA574G will time-up to, or time-down from, depending upon the direction of count selected in the uP or dn function.

oFF Lower display disabled

If the CYCLE5 function is enabled the following three options are available:

5Ed Lower display shows the number of cycles requested together with the current cycle number. During the configurable delay period between cycles the display times-down from the requested delay to zero. A brief notification of timer status i.e. CYCLE or $dELAY$ is shown at the start of each period.

02 - 11

Current cycle number. Number of cycles requested, not shown when cycle is continuously repeated.

LABEL Exactly the same as $5Ed$, but timer status i.e. CYCLE or $dELAY$ is shown periodically.

oFF Lower display disabled.

5.5.9 Starting & stopping the Timer: $5tRr5tOP$

The Timer may be started and stopped by signals on Input A and Input b, or by operation of the front panel $\blacktriangle$ or $\blacktriangledown$ push buttons.

To check or change the control of the Timer, select $5tRr5tOP$ from the configuration menu and press P which will reveal the existing setting which can be changed by pressing the $\blacktriangle$ or $\blacktriangledown$ button followed by the E button to enter the selection and return to the configuration menu. The options available are shown in the following tables.

Voltage inputs and control from front panel

Display	Start	Stop
Control 1	A input high	b input high
Control 2	A input low	b input low
Control 3	A input high	A input low
Control 4	A input low	A input high
LoCAL	$\blacktriangledown$ button	$\blacktriangle$ button

Contact and open collector inputs

Display	Start	Stop
Control 1	A open	b open
Control 2	A closed	b closed
Control 3	A open	A closed
Control 4	A closed	A open

Proximity detector input

Display	Start	Stop
Control 1	A low current	b low current
Control 2	A high current	b high current
Control 3	A low current	A high current
Control 4	A high current	A low current

5.5.10 Units of display: $\mu n, t5$

Defines the format of all displayed times, except the delay time of the status output and control outputs which are always shown in seconds. The grand total is always shown in hours and tenths of an hour.

To check or change the units of display, select $\mu n, t5$ from the configuration menu and press $\boxed{P}$ which will reveal the existing setting which can be changed by pressing the $\boxed{\blacktriangle}$ or $\boxed{\blacktriangledown}$ button followed by the $\boxed{E}$ button to enter the selection and return to the configuration menu. The options available are shown in the following tables:

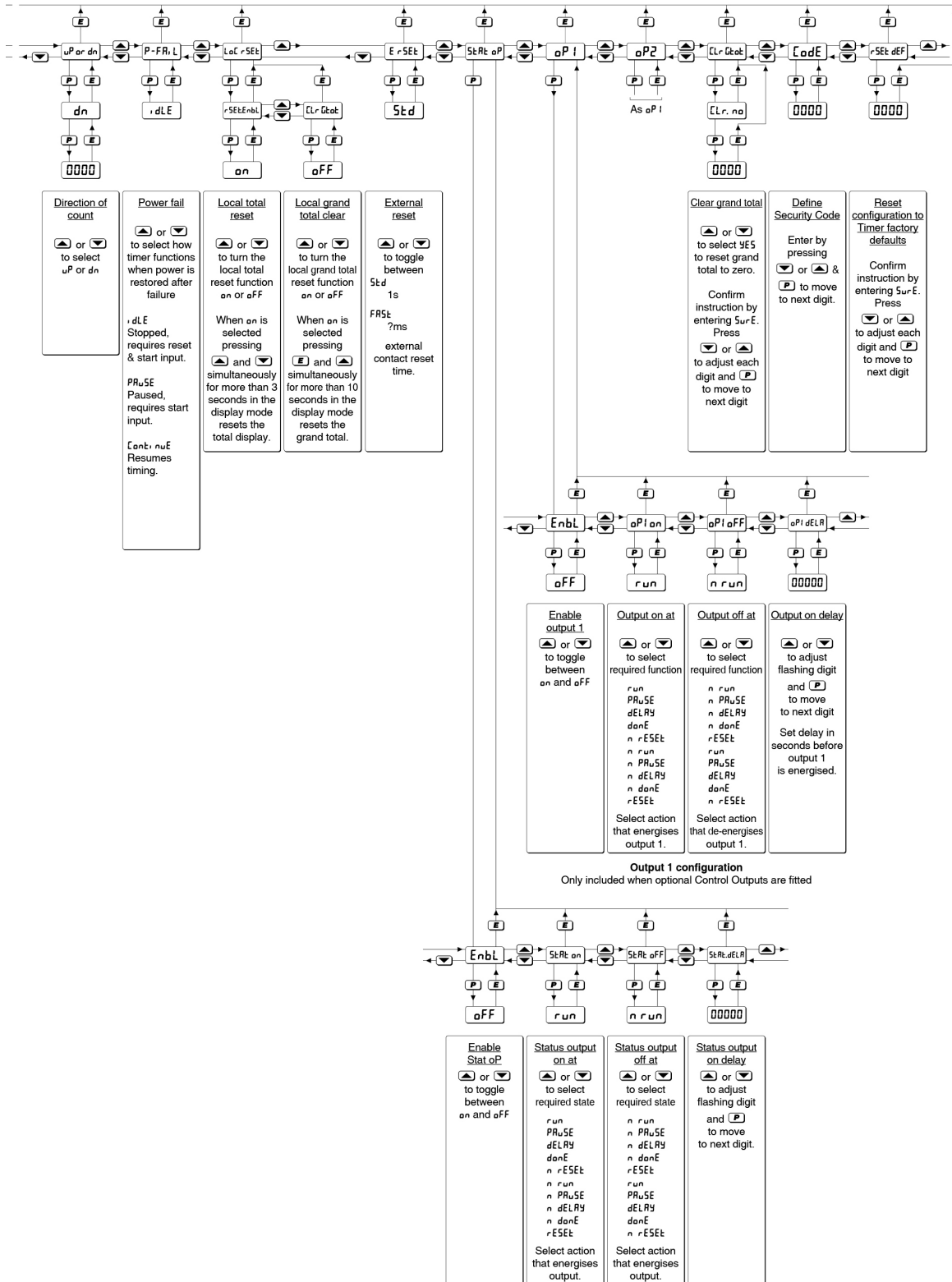
Display

$12:00:00$	Hours, minutes & seconds
$12:00$	Hours & minutes*
$30:00$	Minutes & seconds
30	Seconds

* Only available when time specified in seconds for $5Et\ t$ and $r5t\ dELR$ are zero or exactly divisible by 60.

The Timer's maximum elapsed time in any format is equivalent to 99hours, 59 minutes & 59 seconds.

Fig 10 Timer Configuration menu



5.5.11 Set time: 5EŁ Ł

Set time is the Timer's setpoint. When controlling an external event via the control outputs the BA574G will time-down from the set time to zero or time-up from zero to the set time.

To check or change the set time, select 5EŁ Ł from the configuration menu and press **[P]** which will reveal the existing setting displayed in the units defined by the 5nŁ Ł5 function with the most significant digit flashing. The flashing digit may be adjusted by pressing the **[▲]** or **[▼]** button followed by the **[P]** button to transfer control to the next digit. When set as required, enter the selection and return to the 5EŁ Ł prompt in the configuration menu by operating the **[E]** button.

Can also be adjusted from Timer display mode, see 5.5.16.

Note: If 5EŁ Ł is zero the Timer will not function when an external start input is received or the **[▼]** button is operated.

5.5.12 Repeat timing cycle: ŁYŁŁE5

This a powerful function which allows the BA574G timing cycle to be repeated up to 99 times or continuously with a configurable delay between cycles of up to 99hours, 59 minutes & 59 seconds.

To check or adjust the repeat timing cycle, select ŁYŁŁE5 from the configuration menu and press **[P]** which will enter a sub-menu containing three sub-functions, EŁŁŁ, ŁYŁŁ ŁŁŁ and Ł5Ł ŁEŁŁ which are described in the following sections.

5.5.13 Cycle function enable: EŁŁŁ

This sub-function allows the repeat timing cycle to be enabled or disabled without altering any of the repeat timing cycle parameters. To check or change the function select EŁŁŁ from the repeat timing cycle sub-menu ŁYŁŁE5 and press **[P]** which will reveal if the repeat cycle function is **on** or **off**. The setting can be changed by pressing the **[▼]** or **[▲]** button followed by the **[E]** button to return to the repeat timing cycle sub-menu.

5.5.14 Cycle count: ŁYŁŁ ŁŁŁ

This sub-function defines the number of times the timer cycle is repeated. It may be set to any number between 1 and 99, or to 00 for continuous repetition. To check or change the function select ŁYŁŁ ŁŁŁ from the repeat timing cycle sub-menu ŁYŁŁE5 and press **[P]** which will reveal the number of times the timer cycle is to be repeated with the most significant flashing. The flashing digit may be adjusted by pressing the **[▲]** or **[▼]** button followed by the **[P]** button to transfer control to the next digit.

When set as required, enter the selection and return to the ŁYŁŁ ŁŁŁ prompt in the sub-menu by operating the **[E]** button.

5.5.15 Restart delay: Ł5Ł ŁEŁŁ

This sub-function defines the time delay between repeat timing periods. It is shown in the format selected in the units function and may be set to any time between zero and the maximum time allowed in the selected format.

Time format selected in 5nŁ Ł5	Maximum delay
12:00:00	99:59:59
12:00	99:59
30:00	5999:59
30	359999

To check or change the restart delay time select Ł5Ł ŁEŁŁ from the repeat timing cycle sub-menu ŁYŁŁE5 and press **[P]** which will reveal the delay time in the selected format with the most significant digit flashing. The flashing digit may be adjusted by pressing the **[▲]** or **[▼]** button followed by the **[P]** button to transfer control to the next digit. When set as required, enter the selection and return to the Ł5Ł ŁEŁŁ prompt in the sub-menu by operating the **[E]** button.

Can also be adjusted from Timer display mode, see 5.5.16.

Note: When the repeat timing cycle ŁYŁŁE5 is used, there is no restart delay after the final cycle.

5.5.16 Adjusting the set time 5EŁ Ł and restart delay Ł5Ł ŁEŁŁ from the display mode: ŁE5EŁ Ł

When this function is enabled the Timer's set time 5EŁ Ł and restart delay Ł5Ł ŁEŁŁ can be adjusted from the display mode by simultaneously operating the **[P]** and **[▲]** push buttons. Thus allowing an operator to adjust these parameters without having access to the instrument's configuration menu. The function contains two sub-functions, EŁŁŁ which activates the function and ŁEŁŁ which defines a separate code for access to 5EŁ Ł with the Timer in the display mode.

To check or change the function, select ŁE5EŁ Ł in the configuration menu and press **[P]** which will reveal the EŁŁŁ prompt, pressing **[P]** again will show if the function is **on** or **off**. If adjustment of the set time from the display mode is not required press the **[▲]** or **[▼]** button to select **no** and then press **[E]** twice to return to the configuration menu. If the function is required, select ŁE5 and press **[E]** to return to the EŁŁŁ prompt from which ŁEŁŁ, which allows a separate access code to be entered, can be selected by pressing the **[▲]** or **[▼]** button.

Access to 5EŁ Ł from the display mode may be protected by a four digit alphanumeric security code which must be entered to gain access. Default security code 0000 allows unrestricted access. With RŁŁd displayed, press **[P]** to enter a new access code. The Timer will display 0000 with one digit flashing. The flashing digit may be adjusted using the **[▲]** or **[▼]** push button, when set as required operating the **[P]** button will transfer control to the next digit. When all the digits have been entered press **[E]** twice to return to the RŁ5EŁ Ł prompt in the configuration menu. The revised access code will be activated when the BA574G is returned to the display mode.

Please contact BEKA associates sales department if the access code is lost.

5.5.17 Direction of count: ŁP or dn

The Timer may be configured to time-up from zero to the set time 5EŁ Ł while displaying elapsed time, or to time-down from the set time 5EŁ Ł to zero while displaying the remaining time.

When the repeat timing cycle function ŁYŁŁE5 is enabled, it is recommended that a down count is selected so that the progress of the timer can be observed with a known completion time i.e. zero. If set as an up Timer, elapsed time will be displayed, but the set time 5EŁ Ł at which the timer will stop is not shown.

To check the direction of count, select ŁP or dn from the configuration menu and press **[P]** which will reveal the existing setting. This can be changed by pressing the **[▲]** or **[▼]** button followed by the **[E]** button to enter the selection and return to the configuration menu.

5.5.18 Power Fail: P-FR, Ł

Defines how the Timer powers-up and functions when power is restored after a power supply interruption. Three options are available, ŁdŁE, PŁŁ5E and ŁonŁŁ, nŁŁE.

ŁdŁE The Timer is stopped in the state it achieves when it has timed-up to 5EŁ Ł or timed-down to zero, with the elapsed or remaining time when power was lost shown on the upper display. The Timer must be reset before it can be restarted. If the repeat timing cycle is in use the number of cycles completed will be lost when the Timer is reset.

PŁŁ5E The Timer is stopped in the state it achieves following receipt of a stop input to pause timing – see Fig 9. The elapsed or remaining time when power was lost is shown on the upper display. Timing resumes when a start instruction is received. If a start input exists when power is restored timing will start immediately.

ŁonŁŁ, nŁŁE When power is restored the Timer will continue from where it stopped without any manual intervention.

To check or change the function, select P-FR, Ł from the configuration menu and press **[P]** which will reveal the existing setting which can be changed by pressing the **[▲]** or **[▼]** button followed by the **[E]** button to enter the selection and return to the configuration menu.

5.5.19 Local reset: ŁoŁ Ł5EŁ

The Local reset function contains two separate sub-functions Ł5EŁŁ.EŁŁŁ and ŁŁŁ ŁŁŁŁ which when enabled allow the Timer and the grand total to be reset via the instrument's front panel push buttons while the Timer is in the display mode.

5.5.20 Local total reset: Ł5EŁŁ.EŁŁŁ

Ł5EŁŁ.EŁŁŁ is a sub-function in the ŁoŁ Ł5EŁ function which when activated allows an operator to reset the Timer from the display mode by operating the **[▲]** and **[▼]** push buttons simultaneously for more than three seconds.

To check or change the local total reset select ŁoŁ Ł5EŁ in the configuration menu and press **[P]** which will reveal the Ł5EŁŁ.EŁŁŁ prompt, press **[P]** again to show if the local total reset is on or off. If set as required operate the **[E]** button twice to return to the configuration menu, or the **[▲]** or **[▼]** button to change the setting followed by the **[E]** button twice to enter the change and return to the ŁoŁ Ł5EŁ prompt in the configuration menu.

Note:

The Timer may also be reset remotely by connecting terminals RS1 and RS2 together. See section 2.3

5.5.21 Local grand total reset: ŁŁŁ ŁŁŁŁ

The grand total is the total run-time of the Timer that may be viewed by operating the **[E]** and **[▲]** push buttons simultaneously in the display mode. When activated ŁŁŁ ŁŁŁŁ allows an operator to reset the grand total display to zero from the display mode by operating the **[E]** and **[▲]** push buttons simultaneously for more than ten seconds.

ŁŁŁ ŁŁŁŁ is a sub-function in the ŁoŁ Ł5EŁ menu. To check or change the setting select ŁoŁ Ł5EŁ in the configuration menu and press **[P]** which will reveal Ł5EŁŁ.EŁŁŁ. Using the **[▼]** or **[▲]** button select ŁŁŁ ŁŁŁŁ and press **[P]** to show if local grand total reset is on or off. If set as required operate the **[E]** button twice to return to the configuration menu, or the **[▼]** or **[▲]** button to change the setting followed by the **[E]** button twice to enter the change and return to the ŁoŁ Ł5EŁ prompt in the configuration menu.

5.5.22 External reset

The Timer may be reset by connecting terminals RS1 and RS2 together – see 2.3. This function defines how long the connection must exist before resetting occurs. When resetting is performed by a manually operated external push button switch, **5td** should be chosen. This requires the contact to be closed for one second before resetting occurs which prevents false resetting.

If the Timer is being reset by a control output or similar apparatus **FR5t** should be selected.

Select	Resetting time
5td	1s
FR5t	2ms

5.5.23 Status output: **5tRt oP**

The status output of the Timer is an opto isolated open collector that can be used for transmitting the status of the Timer to other instruments. It may also be used for simple control applications. When the Status output is *on* the RTx annunciator on the Timer display is activated.

The status output function contains four sub-functions, **EnbL**, **5tRt on**, **5tRt oFF** and **5tRtdELR**. To gain access to the sub-menu select **5tRt oP** in the configuration menu and press **[P]** which will show the **EnbL** prompt from which the other sub-functions can be accessed using the **[▼]** or **[▲]** button.

The status output may be configured to turn *on* when the Timer enters a selected Timer state and to turn *off* when the Timer enters another specified Timer state. e.g. if **run** is selected in the **5tRt on** sub-function and **done** is selected the **5tRt oFF** function. The status output will turn *on* when the Timer enters the **run** state and will stay *on* until the Timer enters the **done** state. Alternatively, the status output phase may be reversed by selecting the *n* states such as **n rESEt**.

If the status output is required to be *on* in only one Timer state, this can be achieved with the following configuration.

5tRt on	state required e.g. run
5tRt oFF	<i>n</i> state required e.g. n run

In this example when the Timer enters the **run** state the status output turns *on*. When the Timer moves from the **run** to any other state, the status output turns *off*.

5.5.24 Status output enable: **EnbL**

This function allows the status output to be enabled or disabled without altering any other status output parameters. To check or change the function select **EnbL** from the status output sub-menu and press **[P]** to reveal if the status output is *on* or *oFF*. The setting can be changed by pressing the **[▼]** or **[▲]** button followed by the **[E]** button to return to the status output sub-menu.

5.5.25 Status output *on* : **5tRt on**

The status output may be configured to turn *on* when the Timer enters any one of the five Timer states. Alternatively, the status output phase may be reversed by selecting an *n* state. This will cause the status output to turn *on* when the Timer enters any other than the specified Timer state. Timer states are shown in Fig 9.

To define when the status output turns *on* select **5tRt on** from the sub-menu and press **[P]** to show the existing setting. Pressing the **[▼]** or **[▲]** button will scroll through the options:

Display	Status output turns <i>on</i> when Timer enters selected state
rESEt	Reset state
run	Running state
PRuSEd	Paused state
dELAY	Restart delay state
done	Complete state
Status output turns <i>on</i> when Timer enters any other than the selected state	
n rESEt	Reset state
n run	Running state
n PRuSEd	Paused state
n dELAY	Restart delay state
n done	Complete state

When the required setting has been selected press **[E]** to enter the selection and return to the status output sub-menu.

5.5.26 Status output off: 5tRt oFF

The status output may be configured to turn *off* when the Timer enters any one of the five Timer states. Alternatively, the status output phase may be reversed by selecting an *n* state. This will cause the status output to turn *off* when the Timer enters any other than the specified Timer state. Timer states are shown in Fig 9.

To define when the status output is *off* select 5tRt oFF from the sub-menu and press **[P]** to show the existing setting. Pressing the **[▼]** or **[▲]** button will scroll through the options:

Display	Status output turns off when Timer enters selected state
rESEt	Reset state
rUn	Running state
PRuSEd	Paused state
dELAY	Restart delay state
donE	Complete state
	Status output turns off when Timer enters any other than the selected state
n rESEt	Reset state
n rUn	Running state
n PRuSEd	Paused state
n dELAY	Restart delay state
n donE	Complete state

When the required setting has been selected press **[E]** to enter the selection and return to the status output sub-menu.

6.5.27 Status output on delay time: 5tRtdELR

The status output may be delayed from turning *on* for a fixed time following the selected condition occurring. e.g. when the timer enters the *Run* state. This delay is useful for many control applications, for example when the status output is connected to the reset terminals RS1 and RS2 to automatically reset the BA574G Timer.

This delay can be adjusted in 1 second increments up to 32,400 seconds, which is 9 hours. If a delay is not required zero should be entered. To adjust the delay select 5tRtdELR from the status output sub-menu and press **[P]** which will reveal the existing delay time with one digit flashing. The flashing digit can be adjusted using the **[▼]** or **[▲]** button and the **[P]** button to move to the next digit. When the required delay has been entered, press **[E]** to return to the status output sub-menu.

5.5.28 Control output 1: oP l

Control output 1 is a galvanically isolated solid state switch contact which can be configured to turn *on* and *off* when the Timer enters a specified states. When control output 1 is *on* the '1' annunciator on the Timer display is activated.

The function contains four sub-functions, EnbL, oP l on, oP l oFF and oP l dELR. To gain access to the sub-menu select oP l in the configuration menu and press **[P]** which will show the EnbL prompt from which the other sub-functions can be accessed using the **[▼]** or **[▲]** button.

Control output 1 may be configured to turn *on* when the Timer enters a selected Timer state and to turn *off* when the Timer enters another specified Timer state. e.g. if *rUn* is selected in the oP l on sub-function and *donE* is selected the oP l oFF function. Control output 1 will turn *on* when the Timer enters the *rUn* state and will stay *on* until the Timer enters the *donE* state. Alternatively, the control output phase may be reversed by selecting the *n* states such as *n rESEt*.

If control output 1 is required to be *on* in only one Timer state, this can be achieved with the following configuration.

oP l on	state required	e.g. rUn
oP l oFF	n state required	e.g. n rUn

In this example when the Timer enters the *rUn* state control output 1 turns *on*. When the Timer moves from the *rUn* to any other state, control output 1 turns *off*.

Timer configuration examples in section 6.2. and 6.3 of this manual illustrate the use of the control outputs. Further examples can be found in Application Guide AG374 which is available on the BEKA website.

5.5.29 Control output 1 enable: EnbL

This function allows control output 1 to be enabled or disabled without altering any other control output parameters. To check or change the function select EnbL from the control output 1 sub-menu and press **[P]** to reveal if control output 1 is *on* or *oFF*. The setting can be changed by pressing the **[▼]** or **[▲]** button followed by the **[E]** button to return to the control output 1 output sub-menu.

5.5.30 Control output 1 on at: $\alpha P \mid \alpha n$

Control output 1 may be configured to turn *on* when the Timer enters in any one of the five Timer states. Alternatively, the control output 1 phase may be reversed, by selecting an *n* state which will cause the control output to turn *on* when the Timer enters any other than the specified Timer state. Timer states are shown in Fig 9.

To define when control output 1 turns *on* select $\alpha P \mid \alpha n$ from the sub-menu and press **[P]** to show the existing setting. Pressing the **[▼]** or **[▲]** button will scroll through the options:

Display	Control output 1 turns on when Timer enters selected state
$rESEt$	Reset state
rUn	Running state
$PRuSEd$	Paused state
$dELAY$	Restart delay state
$dOnE$	Complete state

	Control output 1 turns on when Timer enters any other than the selected state
$n rESEt$	Reset state
$n rUn$	Running state
$n PRuSEd$	Paused state
$n dELAY$	Restart delay state
$n dOnE$	Complete state

When the required setting has been selected press **[E]** to enter the selection and return to the status output sub-menu.

5.5.31 Control output 1 off at: $\alpha P \mid \alpha FF$

Control output 1 may be configured to turn *off* when the Timer enters any one of the five Timer states. Alternatively, the phase of control output 1 may be reversed, by selecting an *n* state which will cause the control output to turn *off* when the Timer enters any other than the specified Timer state. Timer states are shown in Fig 9.

To define when control output 1 turns *off* select $\alpha P \mid \alpha FF$ from the sub-menu and press **[P]** to show the existing setting. Pressing the **[▼]** or **[▲]** button will scroll through the options:

Display	Control output 1 turns off when Timer enters selected state
$rESEt$	Reset state
rUn	Running state
$PRuSEd$	Paused state
$dELAY$	Restart delay state
$dOnE$	Complete state

	Control output 1 turns off when Timer enters any other than the selected state
$n rESEt$	Reset state
$n rUn$	Running state
$n PRuSEd$	Paused state
$n dELAY$	Restart delay state
$n dOnE$	Complete state

When the required setting has been selected press **[E]** to enter the selection and return to the control output 1 sub-menu.

5.5.32 Control output 1 on delay time: $\alpha P \mid dELR$

Control output 1 may be delayed from turning *on* (output closed) for a fixed time following the selected condition occurring. e.g. when the Timer enters the *rUn* state. This delay is useful for many control applications, for example when the control output is connected to the reset terminals RS1 and RS2 to automatically reset the BA574G Timer.

The delay can be adjusted in 1 second increments up to 32,400 seconds, which is 9 hours. If a delay is not required zero should be entered. To adjust the delay select $\alpha P \mid dELR$ from the control output 1 sub-menu and press **[P]** which will reveal the existing delay time with one digit flashing. The flashing digit can be adjusted using the **[▼]** or **[▲]** button and the **[P]** button to move to the next digit. When the required delay has been entered, press **[E]** to return to the control output 1 output sub-menu.

5.5.33 Control output 2: $\alpha P2$

Control output 2 is a galvanically isolated solid state switch contact which can be independently configured to turn *on* and *off* when the Timer is any of its five states. Its functions and configuration are identical to control output 1 described in sections 5.5.28 to 5.5.32

The control output status is shown by the '2' control output display annunciator.

5.5.34 Reset grand total from within the configuration menu: $\angle Lr \angle t \alpha t$

The grand total is the total run-time of the Timer that may be viewed by operating the $\angle E$ and $\angle \Delta$ push buttons simultaneously in the display mode.

The grand total can be reset to zero from within the configuration menu using this $\angle Lr \angle t \alpha t$ function, or from the display mode if $\angle Lr \angle t \alpha t$ is activated in the local grand total clear function - see 5.5.21

To zero the Timer grand total from within the configuration menu select $\angle Lr \angle t \alpha t$ and press $\angle P$ which will cause the instrument to display $\angle Lr. n \alpha$ with $n \alpha$ flashing. Operate the $\angle \nabla$ or $\angle \Delta$ push button until $\angle Lr. 9 E 5$ is displayed and then press $\angle P$ which will result in a $\angle \square \square \square \square$ prompt being displayed with the first digit flashing. This is a request for the instruction to be confirmed by entering $5 \alpha r E$ using the $\angle \nabla$ or $\angle \Delta$ button to adjust the flashing digit and the $\angle P$ button to move control to the next digit. Pressing $\angle E$ will then reset the grand total to zero and return the Timer to the configuration menu.

Note:

Once reset, the grand total can not be recovered.

5.5.35 Security code: $\angle \alpha d E$

Access to the instrument configuration menu may be protected by a four digit alphanumeric security code which must be entered to gain access. New instruments are configured with the default security code $\angle \square \square \square \square$ which allows unrestricted access to all configuration functions.

To enter a new security code select $\angle \alpha d E$ from the configuration menu and press $\angle P$ which will cause the Timer to display $\angle \square \square \square \square$ with one digit flashing. The flashing digit may be adjusted using the $\angle \Delta$ or $\angle \nabla$ push button, when set as required operating the $\angle P$ button will transfer control to the next digit. When the new security code has been entered press $\angle E$ to return to the $\angle \alpha d E$ prompt. The revised security code will be activated when the Timer is returned to the display mode.

Please contact BEKA associates sales department if the security code is lost.

5.5.36 Reset configuration to factory defaults $r 5 E t d E F$

When the BA574G is configured as a Timer this function resets the instrument to the Timer factory defaults shown in sections 5.5.

To reset the configuration select $r 5 E t d E F$ from the configuration menu and press $\angle P$. The BA574G will display $\angle \square \square \square \square$ with the first digit flashing which is a request to confirm the instruction by entering $5 \alpha r E$. Using the $\angle \Delta$ or $\angle \nabla$ button set the first flashing digit to 5 and press $\angle P$ to transfer control to the second digit which should be set to α . When $5 \alpha r E$ has been entered pressing the $\angle E$ button will reset all the configuration functions and return the instrument to the display mode.

Note:

$r 5 E t d E F$ does not reset the grand total to zero.

6. TIMER APPLICATION EXAMPLES

This section illustrates three applications for the BA574G when configured as a Timer.

6.1 Measuring the time that a contact is closed.

In this example a BA574G is required to display the time that a process area contact is closed. The display is required in hours and minutes within a process area and is to be reset to zero by a remote push button, not by the instrument front panel push buttons. The operator is required to zero the grand total by operating the and buttons simultaneously. No security codes are required to protect access to the configuration menu.

Figure 11 shows the wiring for the BA574G. This example illustrates how the Timer may be started and stopped by one input, the second input is not used in this application.

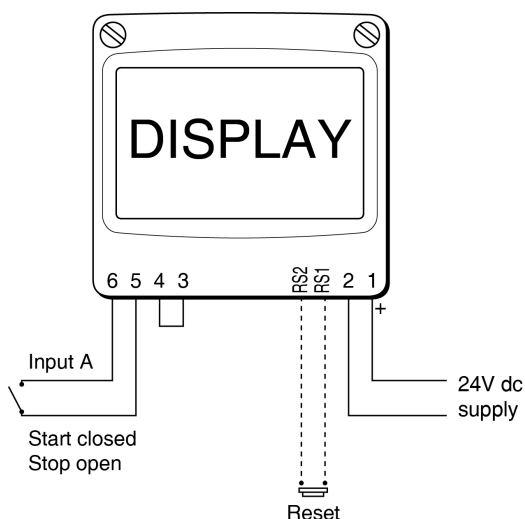


Fig 11 Starting & stopping timer with one input

The required instrument configurations for this example are shown below.

Function	Display	Setting
Access code	[odE	0000
Function	FunE, on	ELAPSE
Input A	, nPut-A	[ontRCE
De-bounce Input A	dEbounEE	dEFRAULt
Display 2	d, SP-2	oFF
Start stop	StArStoP	[ontrol 4
Units	un, t5	12:00
Set time	SEt t	99:59
Direction of count	uP or dn	uP
Local total reset	rESE EnbL	oFF
Local grand total reset	[Lr GtRt	on

6.2 Controlling a solenoid valve

This example illustrates how a BA574G Timer can open a solenoid valve for 5 minutes each time the start button is operated. The operator needs to pause the process without affecting the total time that the valve is open. At the end of the process the Timer is required to automatically reset within 10 seconds ready for the next timing cycle to be started.

Control output 1 is used to switch the solenoid valve, and control output 2 is wired to the Timer's reset terminals to perform the automatic resetting at the end of the timing cycle, see Fig 12.

The Timer is configured to perform one timing cycle [YEL [nt with a restart delay r5t dELR of 5s and Set time SEt t of 5 minutes, the time that the valve is to be open.

Control outputs are configured so that control output one is only closed when the timer is in the run state. Control output 2 is configured to only close when the Timer is in the donE state with a 5 second on delay. The sequence of events is shown in Fig 12 and the Timer's configuration is listed at the end of this section.

This valve opening process is to be linked to other processes on the plant, therefore the status output is required to indicate when the 5 minute valve open period has been completed and when the Timer has been reset and is ready for the next cycle.

When the start button is operated the Timer enters the run state and control output 1 closes for 5 minutes which opens the solenoid valve. At the end of the 5 minute period, the Timer automatically moves from the run to the donE states and control output 1 opens which closes the solenoid valve. Control output 2 is externally wired to the Timer's reset terminals. It is configured to close when the Timer enters the donE state and has been configured with a 5 second on delay. Therefore 5 seconds after the Timer enters the donE state, control output 2 closes and resets the Timer ready to start another cycle when the start button is operated.

If at any time during the cycle the stop button is operated, the Timer will enter the paused state which will stop the process until the start button is operated when it will resume from the place at which it was paused.

In this example Local total reset rESEt.EnbL is on. This enables the Timer to be reset when power is first connected by operating the and push buttons simultaneously for more than three seconds.

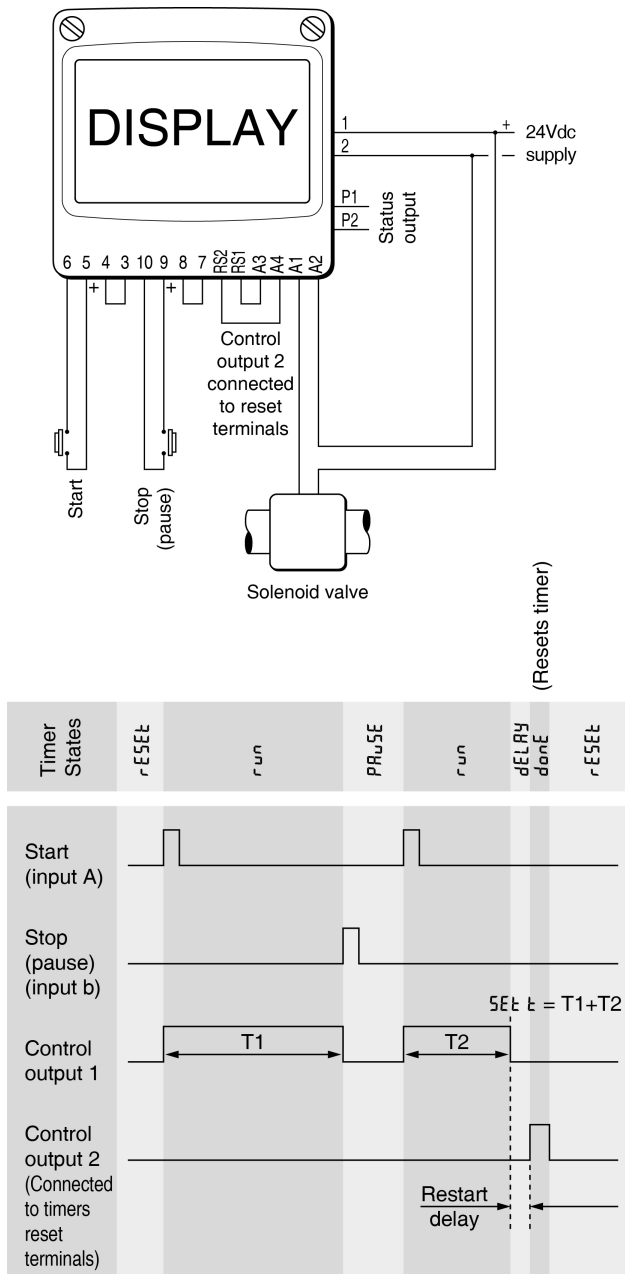


Fig 12 Controlling a process area valve

The required instrument configurations for this example are shown below.

Function	Display	Setting
Access code	Code	0000
Function	Function	ELAPSE
Input A	Input-A	Control
Input b	Input-b	Control
De-bounce (both inputs)	debounce	default

Display 2	di SP-2	Set
Start stop	Start stop	Control 2
Units	units	12:00:00
Set time	Set t	00:05:00

Timer repeat cycle	CYCLES	
Enable repeat cycle	Enbl	off

Power failure	P-FAIL	idle
Local total reset	reset.Enbl	on
Local grand total reset	Ctrl Gate	off
External reset	Reset	Fast

Enable status output	Enbl	on
Status output on at	Start on	reset
Status output off at	Start off	on reset
Status output delay	Start delay	00000

Enable control output 1	Enbl	on
Control output 1 on at	op1 on	run
Control output 1 off at	op1 off	on run
Control output 1 delay	op1 delay	00000

Enable control output 2	Enbl	on
Control output 2 on at	op2 on	done
Control output 2 off at	op2 off	on done
Control output 2 delay	op2 delay	00005

6.3 Cycling a solenoid valve

In this example a BA574G is required to cycle a solenoid valve such that it opens 4 times for 10 minutes at 15 minutes intervals. Once all 4 solenoid valve cycles have been completed a remote “sequence complete” lamp is illuminated until the reset push button is operated.

If, during the sequence, power is lost the control outputs are to remain de-energised when power is restored. The timer is to recommence operating from the last known point when the start push button is pressed.

When the start button is operated control output 1 closes which opens the solenoid valve and the BA574G Timer times-down for 10 minutes. When the elapsed time equals zero, control output 1 opens thus closing the solenoid valve. The timer then counts down the 15 minute delay which is shown on the lower display (display 2). When the delay equals zero, control output 1 closes again for a second 10 minutes, the whole cycle being repeated such that the solenoid valve opens and closes 4 times. After the solenoid valve has closed for a fourth time control output 2 closes which illuminates a “Sequence Complete” lamp indicating that the control sequence is finished.

The lamp remains illuminated until the reset push button is closed for 3 seconds (Reset annunciator on the instrument display is activated) at which point control output 2 is de-energised which turns the lamp off.

Note:

Both the timer (display 1) and delay (display 2) will count down – but the cycle display counts *up* towards its target.

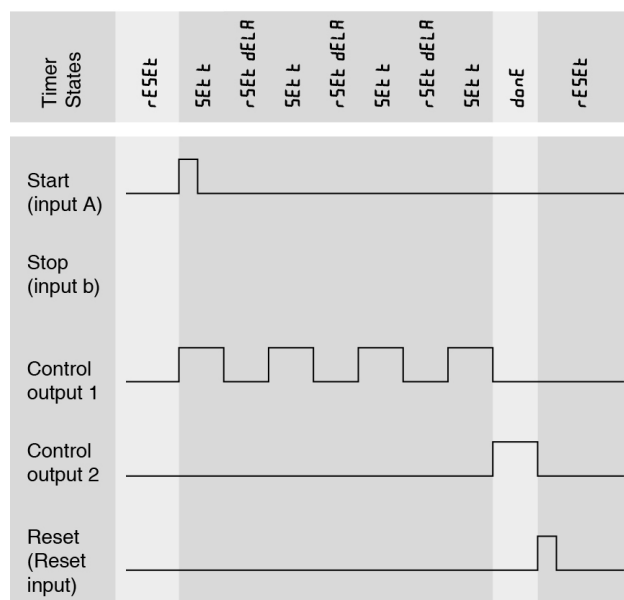
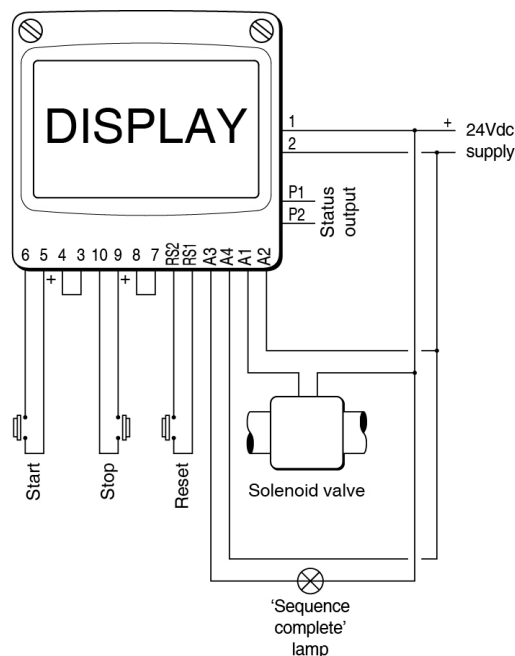


Fig 13 Repeating a valve timing cycle four times

The required instrument configuration for this example is shown below:

Function	Display	Setting
Function	<i>Functi on</i>	ELAPSE
Input A Debounce	<i>Input-A</i> <i>debounce</i>	<i>Control</i> <i>default</i>
Input b Debounce	<i>Input-b</i> <i>debounce</i>	<i>Control</i> <i>default</i>
Display 2	<i>di SP-2</i>	<i>Std</i>
Start stop	<i>Start-Stop</i>	<i>Control 2</i>
Units	<i>units</i>	<i>120000</i>
Set time	<i>Set t</i>	<i>00:10:00</i>
Timer repeat cycle Enable Repeat Cycle Cycle Count Restart delay	<i>CYCLES</i> <i>Enbl</i> <i>Cycle Count</i> <i>rst delay</i>	 <i>on</i> <i>04</i> <i>00:15:00</i>
Access set time from display mode	<i>ACCESS-t</i>	<i>off</i>
Direction of count	<i>up or dn</i>	<i>dn</i>
Control output after power restoration	<i>P-FALL</i>	<i>PRUSE</i>
Local total reset	<i>Local rSet</i>	<i>off</i>
External Reset Contact Closure Time	<i>ErSet</i>	<i>Std</i>
Status Output	<i>Status oP</i>	<i>default</i>
Output 1 Enable control output 1 Control output 1 <i>on</i> at Control output 1 <i>off</i> at Control output 1 delay	<i>oP 1</i> <i>Enbl</i> <i>oP 1 on</i> <i>oP 1 off</i> <i>oP 1 delay</i>	 <i>on</i> <i>run</i> <i>n run</i> <i>000000</i>
Output 2 Enable control output 2 Control output 2 <i>on</i> at Control output 2 <i>off</i> at Control output 2 delay	<i>oP2</i> <i>Enbl</i> <i>oP2 on</i> <i>oP2 off</i> <i>oP2 delay</i>	 <i>on</i> <i>done</i> <i>n done</i> <i>000000</i>
Local grand total reset	<i>GLr Gtob</i>	<i>off</i>
Access code	<i>Code</i>	<i>0000</i>

Note: Functions in bold are first level menu items.

7. MAINTENANCE when configured as a Timer

7.1 Fault finding during commissioning

If a BA574G fails to function as a Timer during commissioning the following procedure should be followed:

Symptom	Cause	Check:
No display	No power supply, or incorrect wiring. Note: Terminals 2, 6, 10 & RS2 are interconnected within the instrument.	That there is between 10 and 30V on terminals 1 & 2 with terminal 1 positive.
Instrument configuration menu does not correspond with Timer section of this manual.	BA574G may be configured as a clock.	That Function in configuration menu is set to ELAPSE not to CLOCK .
Timer will not start.	Timer not reset	Reset timer via external contact or by operating  and  buttons simultaneously if the local total reset RESET.EnbL function has been activated.
	Set time SEt t has not been entered.	Enter time other than zero for SEt t .
Timer will not respond to sensor inputs.	Input A and/or Input b incorrectly configured, or sensor incorrectly connected.	Input A and Input b configuration and that input energising link is correctly fitted for selected sensor.
Control output(s) do not function.	Control outputs have not been enabled.	Enable Control Output(s) in the configuration menu.
Unable to enter configuration menu.	Incorrect security code	That the correct security code is being used. Contact BEKA if the code is lost.

7.2 Fault finding after commissioning

ENSURE PLANT SAFETY BEFORE STARTING MAINTENANCE

If a BA574G Timer fails after it has been functioning correctly, the following table may help to identify the cause of the failure.

Symptom	Cause	Check:
No display	No power supply	That there is between 10 and 30V on terminals 1 & 2 with terminal 1 positive.
Timer will not start.	Timer not reset	Reset timer via external contact or by operating  and  buttons simultaneously if local total reset RESET.EnbL has been activated.
Control output(s) do not function.	Control Outputs have not been enabled.	Enable Control Output(s) in the configuration menu.
Unable to enter configuration menu.	Incorrect security code	That the correct security code is being used. Contact BEKA if code is lost.

If this procedure does not reveal the cause of the fault, it is recommended that the instrument is replaced.

Note:

If configuration changes are made to any of the following functions the Timer will be forced into a fail safe idle condition. This stops the Timer in the state it achieves when it has timed-up to **SEt t** or timed-down to **0000**. The Timer must be reset before it can be restarted.

Input A, **Input b**, **StartStop**, **CLCLE5**, **UP or dn**, **OP1** and **OP2**.

7.3 Servicing

We recommend that faulty BA574G Timers are returned to BEKA associates or to your local BEKA agent for repair. It is helpful if a brief description of the fault symptoms is provided.

7.4 Routine maintenance

The mechanical and electrical condition of the instrument should be regularly checked. Inspection frequency should be chosen to suit the environmental conditions.

7.5 Guarantee

Instruments which fail within the guarantee period should be returned to BEKA associates or our local agent. It is helpful if a brief description of the fault symptoms is provided.

7.6 Customer comments

BEKA is always pleased to receive comments from customers about our products and services. All communications are acknowledged and whenever possible, suggestions are implemented.

8. OPERATION AS A CLOCK

When configured as a clock the BA574G can display local time in a variety of twelve or twenty four hour formats. The displayed time can be adjusted via the front panel push buttons which may be protected by a user definable four digit security code to prevent unauthorised or accidental adjustment.

The clock may be synchronised to an external time standard via the instrument's reset terminals. When these two terminals are connected together by an external switch contact, the clock display will be reset to a preconfigured time and will resume running from this time when the contacts are opened.

The optically isolated status open collector output can be used to monitor the clock or to perform simple control functions.

Using the galvanically isolated control outputs the clock can be configured to turn each solid state output *on* and *off* twice during each twenty four hour period.

Fig 14 shows a simplified block diagram of the BA574G configured as a clock.

The instrument can be supplied with an optional internally powered backlight.

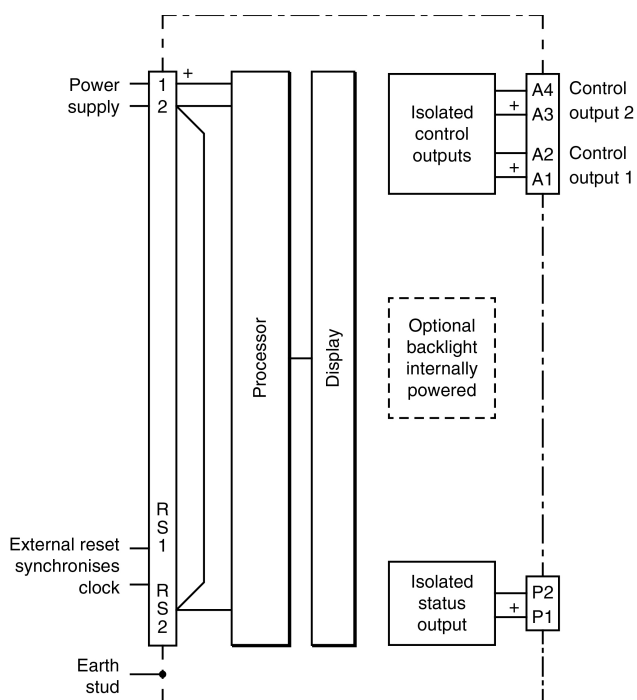


Fig 14 BA574G block diagram with clock configuration.

8.1 Initialisation and loss of power

Each time power is applied to a BA574G initialisation is performed. After a short delay the following display sequence occurs:

All segments of the display are activated

Instrument starts functioning, using the configuration information stored in the instrument's permanent memory.

Following initialisation, the instrument will display a flashing display which is a request for the local time to be entered. The clock will not start to function until a display time has been entered, or the remote reset contacts are closed and opened to synchronise the clock to a preconfigured time.

If during normal operation the power supply is interrupted for more than 30ms, the display will return to the flashing condition and the display time will have to be re-entered. This time may be increased by powering the Clock from an instrument supply with a large output capacitance.

8.2 Controls when configured as a clock

The BA574G clock is configured and adjusted via four front panel push buttons. In the display mode i.e. when the instrument is displaying time, the push button functions are:

Push Button Functions

P + **▼** Shows in succession, firmware version number, instrument function [L o] and any output accessories that are fitted:

- A Dual control outputs
- P Status output (always fitted)

P + **E** Access to configuration menu

Note: The BA574G clock may be configured to provide direct access to the control outputs from the display mode when the **P** + **▲** push buttons are operated. - see section 8.4.16

8.3 Displays when configured as a clock

The BA574G clock has a single digital display plus annunciators.

Time display	Shows time in selected 12 or 24 hour format.
Reset annunciator	Activated while clock is being synchronised and external reset contacts are closed.
Status output annunciator	RTx shown while status output is activated.
Control output annunciators	Shows status of both control outputs.

8.4 Configuration as a Clock

The BA574G is configured and calibrated via four front panel push buttons. All the configuration functions are contained in an easy to use intuitive menu that is shown diagrammatically in Fig 15.

Each menu function is summarised in section 8.4.2 of this manual and each includes a reference to more detailed information.

All new BA574G instruments are supplied configured as requested at the time of ordering. If configuration is not requested, the BA574G will be supplied with default Timer configuration as shown in section 5.5.

If a BA574G Clock is requested without detailed configuration information, the instrument will supplied with default Clock configuration as shown below, but can easily be re-configured on-site.

Function	Display	Default
Access code	[odE	0000
Function	Funct, on	[LoC
Display	d, SPtRY	12:00
Set display time	SEt	A 12:00:00
Synchronise time	SYnE	A 12:00:00
Enable status output	EnbL	oFF
Enable control output 1	EnbL	oFF
Enable control output 2	EnbL	oFF
Enable access alarm	ALSP	oFF
times from display mode.		
Access code for alarm	ALCd	0000
times from display mode.		

8.4.1 Accessing configuration functions

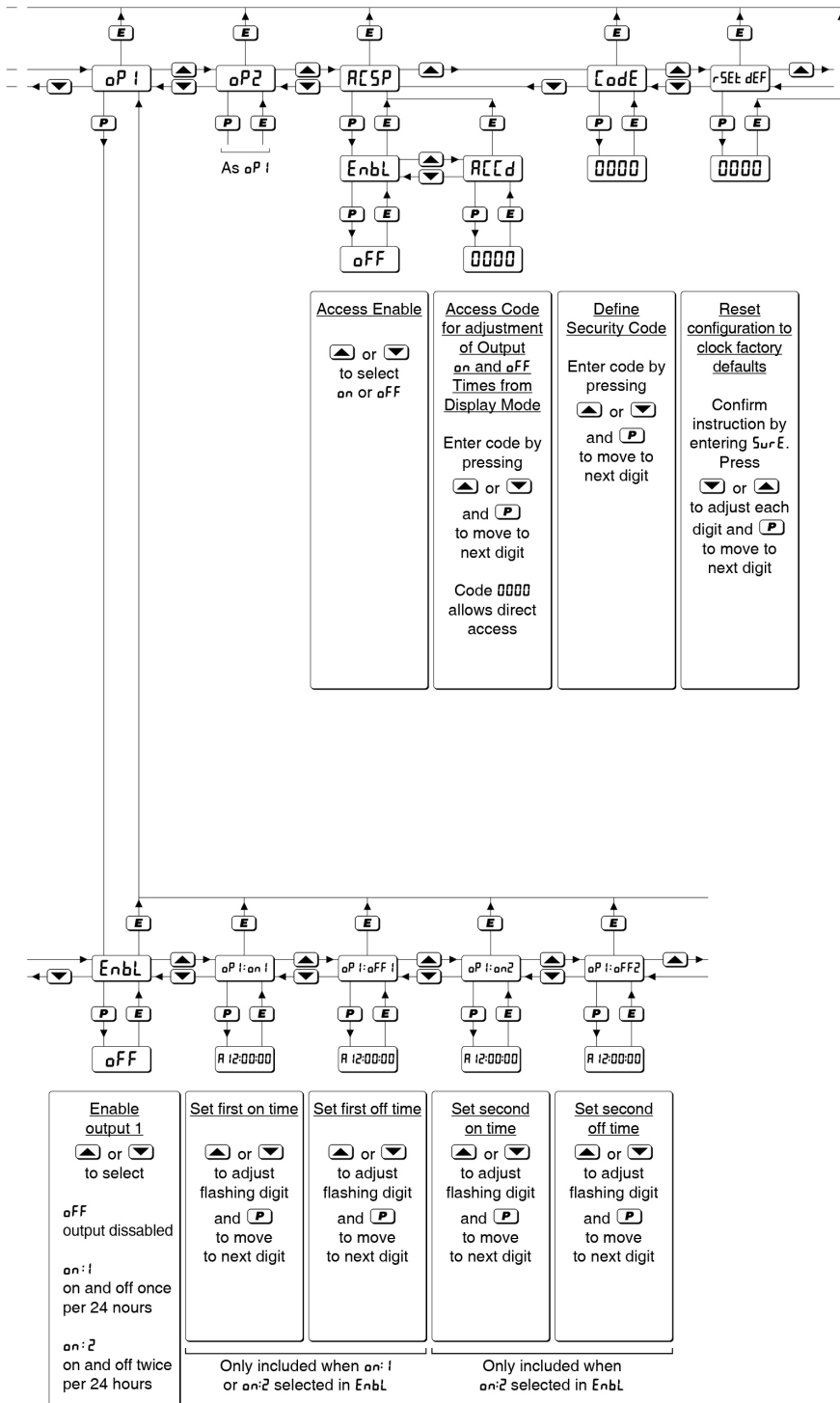
Throughout this manual push buttons are shown as , ,  and  and legends displayed by the Clock are shown in a seven segment font just as they appear on the instrument e.g. d, SPtRY and [odE.

Access to the configuration menu is obtained by operating the  and  push buttons simultaneously. If the instrument is not protected by an access security code the first parameter Funct, on will be displayed. If a security code other than the default code 0000 has already been entered, the instrument will display [odE. Press  to clear this prompt and enter the security code for the instrument using the  or  push button to adjust the flashing digit, and the  push button to transfer control to the next digit. If the correct code has been entered pressing  will cause the first parameter Funct, on to be displayed. If an incorrect code is entered, or a push button is not operated within ten seconds, the instrument will automatically return to the display mode.

All configuration functions and prompts are shown on the upper eight digit display.

Once within the main configuration menu the required parameter can be selected by scrolling through the menu using the  or  push button. The Clock configuration menu is shown diagrammatically in Fig 15.

When returning to the display mode following reconfiguration, the Clock will display dRtR followed by SRYE while the new information is stored in permanent memory.



8.4.2 Summary of Clock configuration functions.

This section summarises all the Clock configuration functions. When read in conjunction with Fig 15 it provides a quick aid for configuring the Clock. If more detail is required, each section of this summary contains a reference to a full description of the function.

Display	Summary of function								
FunCt, on	Instrument function Defines the function of the instrument. May be set to: <table> <tr> <td>ELAPSE</td><td>Timer</td></tr> <tr> <td>CLoC</td><td>Clock</td></tr> </table> All the entries in this Clock configuration summary assume that the BA574G is configured as a Clock by selecting CLoC. See section 8.4.3	ELAPSE	Timer	CLoC	Clock				
ELAPSE	Timer								
CLoC	Clock								
d, SPLAY	Display format Defines the clock display format, four alternatives are available. Select: <table> <tr> <td>12:00</td><td>Twelve hours without seconds</td></tr> <tr> <td>12:00:00</td><td>Twelve hours with seconds</td></tr> <tr> <td>24:00</td><td>Twenty four hours without seconds</td></tr> <tr> <td>24:00:00</td><td>Twenty four hours with seconds</td></tr> </table> See section 8.4.4	12:00	Twelve hours without seconds	12:00:00	Twelve hours with seconds	24:00	Twenty four hours without seconds	24:00:00	Twenty four hours with seconds
12:00	Twelve hours without seconds								
12:00:00	Twelve hours with seconds								
24:00	Twenty four hours without seconds								
24:00:00	Twenty four hours with seconds								
SEt	Set clock display time Enables the clock displayed time to be adjusted, the clock resumes operation when the instrument is returned to the display mode. See section 8.4.5								
SynC t	Synchronising time Defines the time to which the clock display is set when the reset terminals RS1 and RS2 are connected together. The Clock restarts from the synchronising time when terminals RS1 and RS2 are disconnected. See section 8.4.6								

Display	Summary of function										
StAt oP	Status output Status output can turn <i>on</i> (open collector on) and <i>off</i> (open collector off) once or twice in each twenty-four hour period. This function contains five sub-function: <table> <tr> <td>EnbL</td><td>Enables Status output and defines if it turns <i>on</i> and <i>off</i> once or twice in each 24 hours.</td></tr> <tr> <td>StAt: on 1</td><td>Time when oP 1 turns <i>on</i> 1st time</td></tr> <tr> <td>StAt: off 1</td><td>Time when oP 1 turns <i>off</i> 1st time</td></tr> <tr> <td>StAt: on 2</td><td>Time when oP 1 turns <i>on</i> 2nd time</td></tr> <tr> <td>StAt: off 2</td><td>Time when oP 1 turns <i>off</i> 2nd time</td></tr> </table> Note: Output is a open collector See sections 8.4.7 to 8.4.9	EnbL	Enables Status output and defines if it turns <i>on</i> and <i>off</i> once or twice in each 24 hours.	StAt: on 1	Time when oP 1 turns <i>on</i> 1 st time	StAt: off 1	Time when oP 1 turns <i>off</i> 1 st time	StAt: on 2	Time when oP 1 turns <i>on</i> 2 nd time	StAt: off 2	Time when oP 1 turns <i>off</i> 2 nd time
EnbL	Enables Status output and defines if it turns <i>on</i> and <i>off</i> once or twice in each 24 hours.										
StAt: on 1	Time when oP 1 turns <i>on</i> 1 st time										
StAt: off 1	Time when oP 1 turns <i>off</i> 1 st time										
StAt: on 2	Time when oP 1 turns <i>on</i> 2 nd time										
StAt: off 2	Time when oP 1 turns <i>off</i> 2 nd time										
oP 1	Control output 1 Control output 1 can turn <i>on</i> (output closed) and <i>off</i> (output open) once or twice in each twenty-four hour period. This function contains five sub-function: <table> <tr> <td>EnbL</td><td>Enables output 1 and defines if it turns on and off once or twice in each 24 hours.</td></tr> <tr> <td>oP 1: on 1</td><td>Time when oP 1 turns <i>on</i> 1st time</td></tr> <tr> <td>oP 1: off 1</td><td>Time when oP 1 turns <i>off</i> 1st time</td></tr> <tr> <td>oP 1: on 2</td><td>Time when oP 1 turns <i>on</i> 2nd time</td></tr> <tr> <td>oP 1: off 2</td><td>Time when oP 1 turns <i>off</i> 2nd time</td></tr> </table> See sections 8.4.10 to 8.4.12	EnbL	Enables output 1 and defines if it turns on and off once or twice in each 24 hours.	oP 1: on 1	Time when oP 1 turns <i>on</i> 1 st time	oP 1: off 1	Time when oP 1 turns <i>off</i> 1 st time	oP 1: on 2	Time when oP 1 turns <i>on</i> 2 nd time	oP 1: off 2	Time when oP 1 turns <i>off</i> 2 nd time
EnbL	Enables output 1 and defines if it turns on and off once or twice in each 24 hours.										
oP 1: on 1	Time when oP 1 turns <i>on</i> 1 st time										
oP 1: off 1	Time when oP 1 turns <i>off</i> 1 st time										
oP 1: on 2	Time when oP 1 turns <i>on</i> 2 nd time										
oP 1: off 2	Time when oP 1 turns <i>off</i> 2 nd time										
oP 2	Control output 2 As control output 1 described above. See section 8.4.13 to 8.4.15										
ACSP	Access control output alarm-times from display mode. Contains two sub-functions, EnbL which when activated allows the control output times to be adjusted from the display mode (displaying time). The second sub-function RCLd defines a four digit alphanumeric access code which may be used to protect access to the control output times from the display mode. Default code 0000 disables this security feature and allows unrestricted access. See section 8.4.16										

Display	Summary of function
Code	Security code Defines a four digit alphanumeric code that may be used to protect access to the Clock configuration menu. Default code 0000 disables this security function and allows unrestricted access to all configuration functions when the [P] and [E] buttons are operated simultaneously in the display mode. See section 8.4.17
rSEt dEF	Reset to factory defaults Resets the BA574G to the Clock factory default configuration shown in section 8.4 Instruction confirmed by entering SurE. See section 8.4.18

8.4.3 Instrument function: **FunE, on**

The BA574G may be configured as a Timer or as a Clock. This section of the instruction manual describes the Clock, for details of Timer configuration see section 5.4.

To reveal the existing function of the instrument select **FunE, on** from the configuration menu and press **[P]**. If **CLoC** is displayed, the instrument is already configured as a Clock therefore press **[E]** to return to the **FunE, on** prompt in the configuration menu. If **ELAPSE** is displayed, press the **[▲]** or **[▼]** button to change the setting to **CLoC** followed by the **[P]** button which will result in a **0000** prompt being displayed with the first digit flashing. This is a request for the instruction to be confirmed by entering **SurE** using the **[▲]** or **[▼]** button to adjust the flashing digit and the **[P]** button to move control to the next digit. When **SurE** has been entered, pressing **[E]** will change the instrument to a Clock and return the instrument to the display mode. To configure the Clock enter the configuration menu by pressing the **[P]** and **[E]** buttons simultaneously until **FunE, on** is displayed.

8.4.4 Display format: **d, SPLRY**

The BA574G Clock may be configured to display time in a 12 or 24 hour format with or without seconds. When a 12 hour format is selected, AM is denoted by an **A** prefix at the left hand side of the display, similarly a **P** is displayed to denote PM.

To check or change the display format of the Clock, select **d, SPLRY** from the configuration menu and press **[P]** which will reveal the existing setting which can be changed by pressing the **[▲]** or **[▼]** button followed by the **[E]** button to enter the selection and return to the configuration menu. The options available are shown below:

12:00	Twelve hour format without seconds
12:00:00	Twelve hour format with seconds
24:00	Twenty four hour format without seconds
24:00:00	Twenty four hour format with seconds

8.4.5 Set clock display time: **SEt**

This function sets the time displayed by the Clock which must be entered each time the BA574G Clock is powered. Until a set time is entered the Clock will display a flashing **00:00:00** or **00:00** depending upon how it has been configured.

To adjust the clock set time, select **SEt** from the configuration menu and press **[P]** that will show **00:00:00** or the existing set time with the hours flashing. When setting the clock display time seconds are always shown. Using the **[▲]** or **[▼]** button adjust the flashing hours and then press **[P]** to transfer control to the minutes display, pressing **[P]** again will transfer control to the seconds display. When adjustment is complete press **[E]** to start the Clock and return to the **SEt** prompt.

8.4.11 Enable Control output 1: *EnbL*

This is a sub-function in the Control output 1 function *oP 1* which allows control output 1 to be enabled or disabled without changing any of the *on* or *off* times and also determines whether control output 1 turns *on* and *off* once or twice in each twenty four hour period.

Select *oP 1* in the configuration menu and press **[P]** which will result in the *EnbL* prompt being displayed. Pressing **[P]** again will enter the sub-function from which one of the three options may be selected using the **[▲]** or **[▼]** button:

Display	Control output 1
<i>oFF</i>	Control output 1 disabled
<i>on: 1</i>	Turns <i>on</i> & <i>off</i> once per 24 hours
<i>on: 2</i>	Turns <i>on</i> & <i>off</i> twice per 24 hours

When the required option is displayed operating **[E]** will enter the selection and return to the *EnbL* prompt from which another sub-function may be selected if control output 1 has not been disabled.

8.4.12 Control output 1

On and off times: *oP 1: on 1*; *oP 1: oFF 1*
oP 1: on 2; *oP 1: oFF 2*

The control output will have one or two *on* and *off* times depending upon whether control output 1 has been configured to turn *on* and *off* once or twice in each 24 hour period. - see 8.4.11.

All of the times are adjusted in the same way. To adjust any of them select *oP 1* from the configuration menu and press **[P]** which will result in the *EnbL* prompt being displayed. The **[▲]** or **[▼]** button will scroll through the sub-functions. Only *oP 1: on 1* and *oP 1: oFF 1* will be present if control output 1 has been configured to switch *on* and *off* once in a 24 hour period in the *EnbL* sub-function.

Select the required sub-function

<i>oP 1: on 1</i>	Time oP1 turns <i>on</i> first time
<i>oP 1: oFF 1</i>	Time oP1 turns <i>off</i> first time
<i>oP 1: on 2</i>	Time oP1 turns <i>on</i> second time
<i>oP 1: oFF 2</i>	Time oP1 turns <i>off</i> second time

When selected, pressing **[P]** will show the existing time with the hours flashing. Using the **[▲]** or **[▼]** button adjust the hours and then press **[P]** to transfer control to the minutes display, pressing **[P]** again will transfer control to the seconds display. When the time has been set as required press **[E]** to return to the sub-menu from which another *on* / *off* time may be selected for adjustment. When all the *on* / *off* times have been entered, return to the configuration menu by pressing the **[E]** button twice.

8.4.13 Control output 2: *oP2*

Control output 2 is a galvanically isolated output which can be configured to turn *on* (output closed) and *off* (output open) twice in each twenty-four hour period. The control output status is shown by the 2 control output display annunciator.

Function *oP2* contains a sub-menu with five sub-functions:

<i>EnbL</i>	Disabled or number of times output 2 turns <i>on</i> & <i>off</i> in 24 hours.
<i>oP 2: on 1</i>	First time when oP 2 turns <i>on</i> (closes)
<i>oP 2: oFF 1</i>	First time when oP 2 turns <i>off</i> (opens)
<i>oP 2: on 2</i>	Second time when oP 2 turns <i>on</i> (closes)
<i>oP 2: oFF 2</i>	Second time when oP 2 turns <i>off</i> (opens)

To check or change the function of Control output 2 select *oP2* from the configuration menu and press **[P]** which will reveal the first sub-function *EnbL*.

8.4.14 Enable control output 2: *EnbL*

This is a sub-function in the Control output 2 function *oP2* which allows control output 2 to be enabled or disabled without changing any of the *on* or *off* times and also determines whether control output 2 turns *on* and *off* once or twice in each twenty four hour period. Select *oP2* in the configuration menu and press **[P]** which will result in the *EnbL* prompt being displayed. Pressing **[P]** again will enter the sub-function from which one of the three options may be selected using the **[▲]** or **[▼]** button:

Display	Control output 2
<i>oFF</i>	Control output 2 disabled
<i>on: 1</i>	Turns <i>on</i> & <i>off</i> once per 24 hours
<i>on: 2</i>	Turns <i>on</i> & <i>off</i> twice per 24 hours

When the required option is displayed operating **[E]** will enter the selection and return to the *EnbL* prompt from which another sub-function may be selected if control output 2 has not been disabled.

8.4.15 Control output 2

On and off times: *oP2: on 1*; *oP2: oFF 1*
oP2: on 2; *oP2: oFF 2*

The control output will have one or two *on* and *off* times depending upon whether control output 2 has been configured to turn *on* and *off* once or twice in each 24 hour period. - see 8.4.14.

All of the times are adjusted in the same way. To adjust any of them select *oP2* from the configuration menu and press **[P]** which will result in the *EnbL* prompt being displayed. The **[▲]** or **[▼]** button will scroll through the sub-functions. Only *oP2: on 1* and *oP2: oFF 1* will be present if control output 2 has been configured to switch *on* and *off* once in a 24 hour period in the *EnbL* sub-function.

Select the required sub-function

oP2:on 1	Time oP2 turns <i>on</i> first time
oP2:off 1	Time oP2 turns <i>off</i> first time
oP2:on 2	Time oP2 turns <i>on</i> second time
oP2:off 2	Time oP2 turns <i>off</i> second time

When selected pressing **[P]** will show the existing time with the hours flashing. Using the **[▲]** or **[▼]** button adjust the hours and then press **[P]** to transfer control to the minutes display, pressing **[P]** again will transfer control to the seconds display. When the time has been set as required press **[E]** to return to the sub-menu from which another *on / off* time may be selected for adjustment. When all the *on / off* times have been entered, return to the configuration menu by pressing the **[E]** button twice.

8.4.16 Access control output *on* and *off* times from display mode: **RC5P**

This function activates a separate menu that provides direct access to the control output's *on* and *off* times when the Clock is in the display mode (displaying time). An operator may therefore adjust the *on* and *off* times without having access to the instrument configuration menu. Further protection is provided by a separate security code. When this function is enabled the *on* and *off* times of the two control outputs may be adjusted from the display mode by simultaneously operating the **[P]** and **[▲]** push buttons. The function contains two sub-functions, **EnbL** which activates the function and **RCd** which defines a separate access code that may be used to prevent the *on* and *off* times being accidentally adjusted from the display mode.

To check or change the function, select **RC5P** in the configuration menu and press **[P]** which will reveal the **EnbL** prompt, pressing **[P]** again will show if the function is *on* or *off*. If adjustment of the control output times from the display mode is not required press the **[▲]** or **[▼]** button to select *off* and then press **[E]** twice to return to the configuration menu. If the function is required, select *on* and press **[E]** to return to the **EnbL** prompt from which **RCd**, which allows a separate access code to be entered, can be selected by pressing the **[▲]** or **[▼]** button.

Access to the control output times from the display mode may be protected by a four digit alphanumeric security code which must be entered to gain access. Default security code **0000** allows unrestricted access. With **RCd** displayed, press **[P]** to enter a new access code. The BA574G Clock will display **0000** with one digit flashing. The flashing digit may be adjusted using the **[▲]** or **[▼]** push button, when set as required operating the **[P]** button will transfer control to the next digit. When all the digits have been adjusted press **[E]** twice to return to the **RC5P** prompt in the configuration menu. The revised security code will be activated when the BA574G is returned to the display mode.

8.4.17 Security code: **LoadE**

Access to the instrument's configuration menu may be protected by a four digit alphanumeric security code which must be entered to gain access. New instruments are configured with the default security code **0000** which allows unrestricted access to all configuration functions.

To enter a new security code select **LoadE** from the configuration menu and press **[P]** which will cause the Clock to display **0000** with one digit flashing. The flashing digit may be adjusted using the **[▲]** or **[▼]** push button, when set as required operating the **[P]** button will transfer control to the next digit. When all the digits have been adjusted press **[E]** to return to the **LoadE** prompt. The revised security code will be activated when the Clock is returned to the display mode.

Please contact BEKA associates sales department if the security code is lost.

8.4.18 Reset configuration to factory defaults: **r5Ee dEF**

When the BA574G is configured as a Clock, this function resets the configuration to the Clock factory defaults shown in sections 8.4 of this manual.

To reset the instrument configuration select **r5Ee dEF** from the configuration menu and press **[P]**. The Clock will display **0000** with the first digit flashing which is a request to confirm the instruction by entering **5urE**. Using the **[▲]** or **[▼]** button set the first flashing digit to 5 and press **[P]** to transfer control to the second digit which should be set to **u**. When **5urE** has been entered pressing the **[E]** button will reset all the configuration functions to the factory defaults and return the instrument to the display mode as a Clock with default configuration.

9. CLOCK CONFIGURATION EXAMPLE

In this example a BA574G is required to function as a Clock displaying time in a 24 hour format including seconds. For external synchronisation the displayed time is required to change to 12:00:00 when the external reset terminals are connected together.

Both control outputs are required to close and open once in each 24 hour period. Control output 1 (OP1) is to turn *on* (close) at 07:30:00 and *off* (open) at 09:30:00, control output 2 (OP2) is to turn *on* (close) at 18:00:00 and *off* (open) at 22:30:00.

For this application the operator needs to adjust the control output *on* and *off* times from the display mode via an access code of 1111. To prevent tampering the instrument configuration menu is to be protected by security code of 1209

9.1 Configuration procedure

The BA574G may be configured as a Clock on-site without disconnection from external wiring.

Step 1 Enter the configuration menu

Enter the configuration menu by simultaneously pressing **[P]** and **[E]**. Assuming a security code has not already been entered the instrument will respond by displaying *FuncE, on* which is the first item in the configuration menu.
See Fig 15.

Step 2 Configure instrument as a Clock

With *FuncE, on* displayed press **[P]** to reveal the existing function of the instrument. If *ELoC* is displayed no change is required, therefore return to the *FuncE, on* prompt by pressing the **[E]** button.

If *ELAPSE* is displayed, press the **[▲]** or **[▼]** button to change the setting to *ELoC* followed by the **[P]** button which will result in a *0000* prompt being displayed with the first digit flashing. This is a request for the instruction to be confirmed by entering *SurE* using the **[▼]** or **[▲]** button to adjust the flashing digit and the **[P]** button to move control to the next digit. Pressing **[E]** will then change the instrument to a Clock and return the display to *FuncE, on* in the configuration menu.

See 8.4.3

Step 3 Select display format

Using the **[▲]** or **[▼]** button select *d, SPLRY* in the configuration menu and press **[P]** which will reveal the current display format. Using the **[▲]** or **[▼]** button select *24:00:00* which is the required 24 hour format with seconds and press **[E]** to enter the selection and return to the configuration menu.

See 8.4.4

Step 4 Enter the synchronisation time

Using the **[▲]** or **[▼]** button select *SynC t* in the configuration menu and press **[P]** to reveal the current synchronisation time with the hours flashing. Using the **[▲]** or **[▼]** push button adjust the hours to 12 and press **[P]** to transfer control to the minutes. Using the **[▲]** or **[▼]** push button adjust the minutes to 00 and press **[P]** to transfer control to the seconds which should be adjusted to 00, in the same way. When the seconds are set enter the selection and return to the *r5Et* prompt in the configuration menu by pressing the **[E]** button.

See 8.4.6

Step 5 Enable control output 1 and enter the *on* and *off* times.

Using the **[▲]** or **[▼]** button select *OP1* in the configuration menu and press **[P]** to reveal the *EnbL* prompt in the control output 1 sub-menu.

In this application control output 1 is required to turn *on* and *off* once every 24 hours. With *EnbL* displayed press **[P]** and using the **[▲]** or **[▼]** button select *on t* followed by the **[E]** button to return to the *EnbL* prompt.

The control outputs *on* time should now be entered by selecting *OP1: on t* in the control output 1 sub-menu using the **[▲]** or **[▼]** button. Pressing **[P]** will reveal the existing *on* time which should be adjusted to 07:30:00 using the **[▲]** or **[▼]** button and the **[P]** button to transfer control to the following digits. When entered return to the *OP1: on t* prompt by pressing the **[E]** button.

The *off* time should now be entered by selecting *OP1: off t* from the sub-menu and adjusting the time to 09:30:00. Finally press **[E]** to return to the *OP1: off t* prompt in the sub-menu and press **[E]** again to return to *OP1* in the configuration menu.

Step 6 Enable control output 2 and enter the on and off times.

Using the  or  button select **oP2** in the configuration menu and press  to reveal the **EnbL** prompt in the control output 2 sub-menu. Follow the procedure described in step 5 above, but set control output 2 to turn on at 18:00:00 and off at 22:30:00.

Step 7 Allow control outputs times to be adjusted from the display mode & enter separate security code.

Using the  or  button select **RESP** in the configuration menu and press  to reveal the **EnbL** prompt, pressing  again will show if this function is **on** or **off**. Using the  or  button select **on** followed by  to return to the **EnbL** prompt. A separate security code which must be entered to gain access to the alarm times in the display mode, is entered in the **REEd** function which may be selected by operating the  or  button once. Pressing  will reveal the existing access code with one digit flashing. This should be changed to the required code of 1111 by adjusting the flashing digit using the  or  button and the  button to transfer control to the next digit. When 1111 has been entered press  twice to return to the configuration menu. See 8.4.16

Step 8 Define the configuration menu security code.

Defining a security code prevents unauthorised access to the configuration menu. Using the  and  buttons select **REdE** from the configuration menu and press  which will reveal 0000 with the first digit flashing. This example requires the security code to be 1209, using the  and  buttons set the flashing digit to 1 and press  to transfer control to the second digit. When all have been entered press  to return to the main configuration menu. See 8.4.17.

Step 9 Return to the display mode

The BA574G is now configured as required for this example. Pressing the  button will save the configuration and return the BA574G to the display mode with all the digits flashing indicating that the set time has to be entered.

Step 10 Enter the set time

Finally the current time to be displayed by the Clock should be entered. Re-enter the configuration menu by pressing the  and  buttons simultaneously which will result in **REdE** being displayed. Pressing  will allow the access code 1209 to be entered using the  or  button to adjust the flashing digit and the  button to transfer control to the next digit. When all four digits have been adjusted, press  to enter the configuration menu and using the  or  button select **SEt** and press  which will reveal 00:00:00 with the hours flashing. Using the  or  button adjust the flashing hours digit and press  to transfer control to the minutes and then to the seconds. When all have been set as required, press  to start the clock from the entered time and return to the display mode.

See 8.4.5

10. MAINTENANCE when configured as a clock

10.1 Fault finding during commissioning

If a BA574G fails to function as a Clock during commissioning the following procedure should be followed:

Symptom	Cause	Check:
No display	No power supply, or incorrect wiring. Note: Terminals 2 & RS2 are interconnected within the instrument.	That there is between 10 and 30V on terminals 1 & 2 with terminal 1 positive. That there are no connections to terminals 3, 4, 5, 6, 7, 8, 9 & 10.
Configuration menu does not correspond with the Clock section of this manual.	BA574G is configured as a Timer.	That <i>Function</i> in configuration menu is set to <i>Clock</i> not to <i>ELAPSE</i> .
Clock display flashes 00:00:00	Local time has not been entered.	Enter the local time in the <i>Set</i> function of the instrument configuration menu.
Control output(s) do not function.	Control outputs have not been enabled.	Enable Control Output(s) in the configuration menu.
Clock will not start	Reset terminals RS1 and RS2 are connected together and the Clock is continuously synchronising.	If reset annunciator on display is activated, disconnect connection between RS1 and RS2.
Unable to enter configuration menu.	Incorrect security code	That the correct security code is being used. Contact BEKA if the code is lost.

10.2 Fault finding after commissioning

ENSURE PLANT SAFETY BEFORE STARTING MAINTENANCE

If a BA574G fails after it has been functioning correctly as a Clock, the following table may help to identify the cause of the failure.

Symptom	Cause	Check:
No display	No power supply	That there is between 10 and 30V on terminals 1 & 2 with terminal 1 positive.
Clock display flashes 00:00:00	Instrument power supply has been interrupted and local time has been lost.	Enter the local time in the <i>Set</i> function of the instrument configuration menu.
Control output(s) do not function.	Control outputs have not been enabled.	Enable Control Output(s) in the configuration menu.
Clock will not start	Reset terminals RS1 and RS2 are connected together and the Clock is continuously synchronising.	If reset annunciator on display is activated, if it is disconnect connection between RS1 and RS2.
Unable to enter configuration menu.	Incorrect security code	That the correct security code is being used. Contact BEKA if the code is lost.

If this procedure does not reveal the cause of the fault, it is recommended that the instrument is replaced.

10.3 Servicing

We recommend that faulty BA574G Clocks are returned to BEKA associates or to your local BEKA agent for repair. It is helpful if a brief description of the fault symptoms is provided.

10.4 Routine maintenance

The mechanical and electrical condition of the instrument should be regularly checked. Inspection frequency should be chosen to suit the environmental conditions.

10.5 Guarantee

Instruments which fail within the guarantee period should be returned to BEKA associates or our local agent. It is helpful if a brief description of the fault symptoms is provided.

10.6 Customer comments

BEKA is always pleased to receive comments from customers about our products and services. All communications are acknowledged and whenever possible, suggestions are implemented.