Installation, Operation and Maintenance

SA15/8 Auto Restart Unit

PATENTED
UK patent no.160346

Timekeeping back-up system for synchronous clock movements

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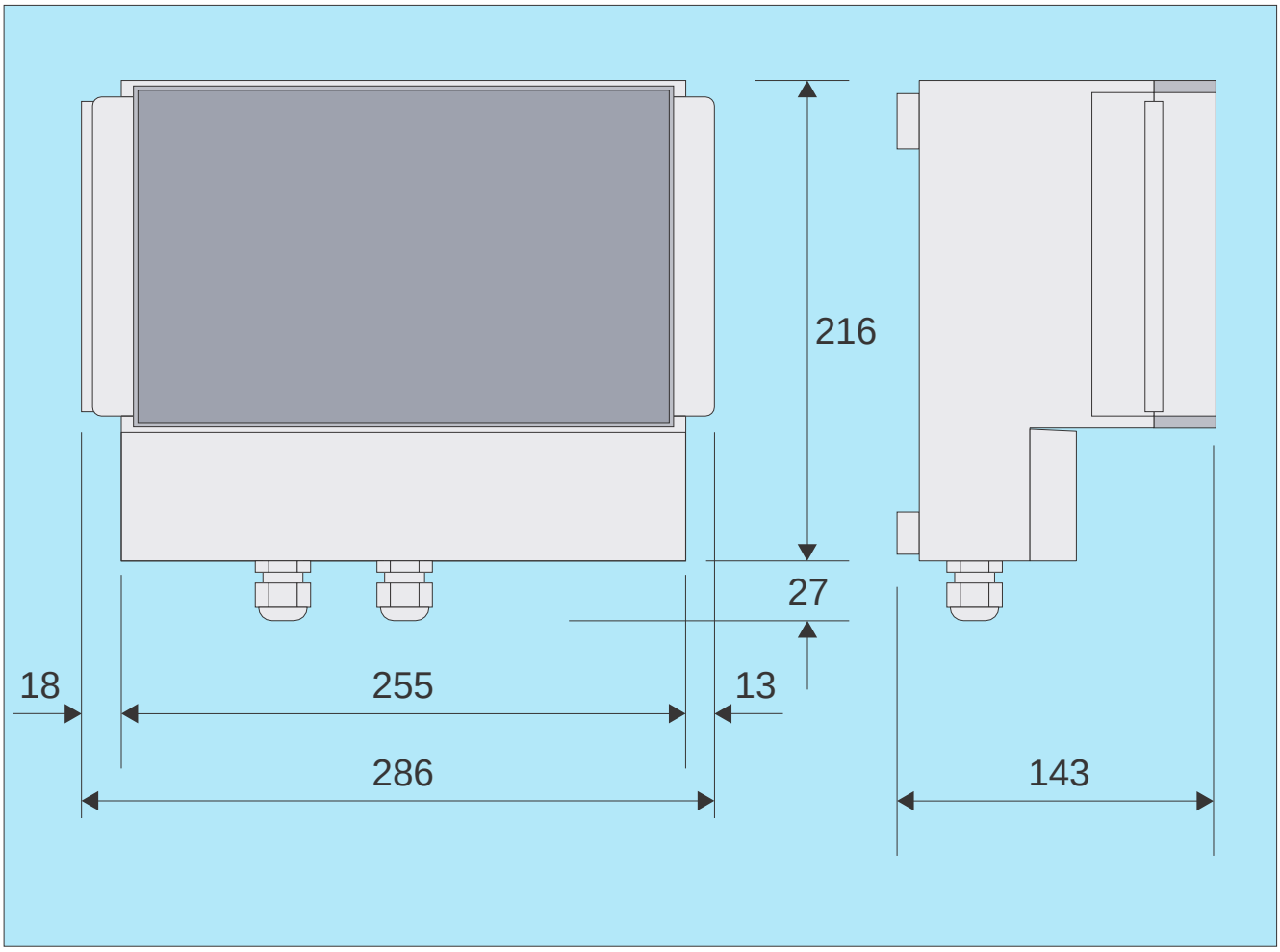
SMITH OF DERBY
CLOCKMAKERS • EST. 1856

1 DIMENSIONS, SPECIFICATION



SA15/8 Auto Restart Unit overall dimensions

TECHNICAL SPECIFICATION

Suitable for internal or enclosed fixing locations only.

Case constructed in light grey high impact resistant polystyrene with clear protective cover/door, protected to IP54.

Weight: 1.42kg/3.2lb.

Memory back-up battery type CR2032.

Memory battery life expectancy: 10 years.

Supply: 230V or 110V 5A single phase (must be specified on order).

Operating temperature range -5 degrees to +30 degrees Celsius (non-fan equipped).

Power consumption: maximum 2 watts

(plus maximum 5 watts per clock movement: T100/200/300/400 synchronous movements).

Timekeeping accuracy (quartz controlled option): better than +/- 1 second/week.

2 OPERATION

2.1 APPLICATION

The Automatic Restart Unit (ARU) is specifically designed to control up to four synchronous clock movements, ideally Smith of Derby T100/T200/T300/T400/T500 series. No other electrical device or equipment should ever be connected to the clock output connectors.

THE CONNECTION OF ANY OTHER ELECTRICAL DEVICE OR EQUIPEMENT WILL INVALIDATE THE WARRANTY AND COULD CAUSE DAMAGE TO THE AUTO RESTART UNIT

2.2 CLOCK OPERATION

The unit will monitor and control the mains power to any suitable synchronous clock having a power consumption of less than 10 watts. If a power failure occurs for longer than 30 seconds then the clock(s) will automatically be stopped for exactly 12/24 hours (depending on unit settings), re-starting later at the correct time. If the mains power is still off then the unit will continue timing further power interruptions until the mains power is reinstated, whereupon the clock(s) will restart at the correct time.

2.3 TIME AND DATE

The clock time and date are pre-programmed at the factory and under normal circumstances should not need resetting. However, if the need arises, please follow the instructions in section 5 to reset the time and date

2.4 SUMMER/WINTER (DAYLIGHT SAVING) TIME

The Auto Restart Unit is programmed to adjust the clock(s) automatically for each summer/winter time alteration. The unit is set to the correct summer/winter or daylight saving time formula for the location, and no attention to the unit or clock(s) should be necessary.

The unit is programmed with known dates for the locality to which it is supplied. If the changeover dates need to be amended in the future, follow the instructions in section 6 to re-set.

2.5 NORMAL OPERATION

After initial set-up all operations are automatically controlled. There are two LED indicators on the front panel to show the current status of the unit:

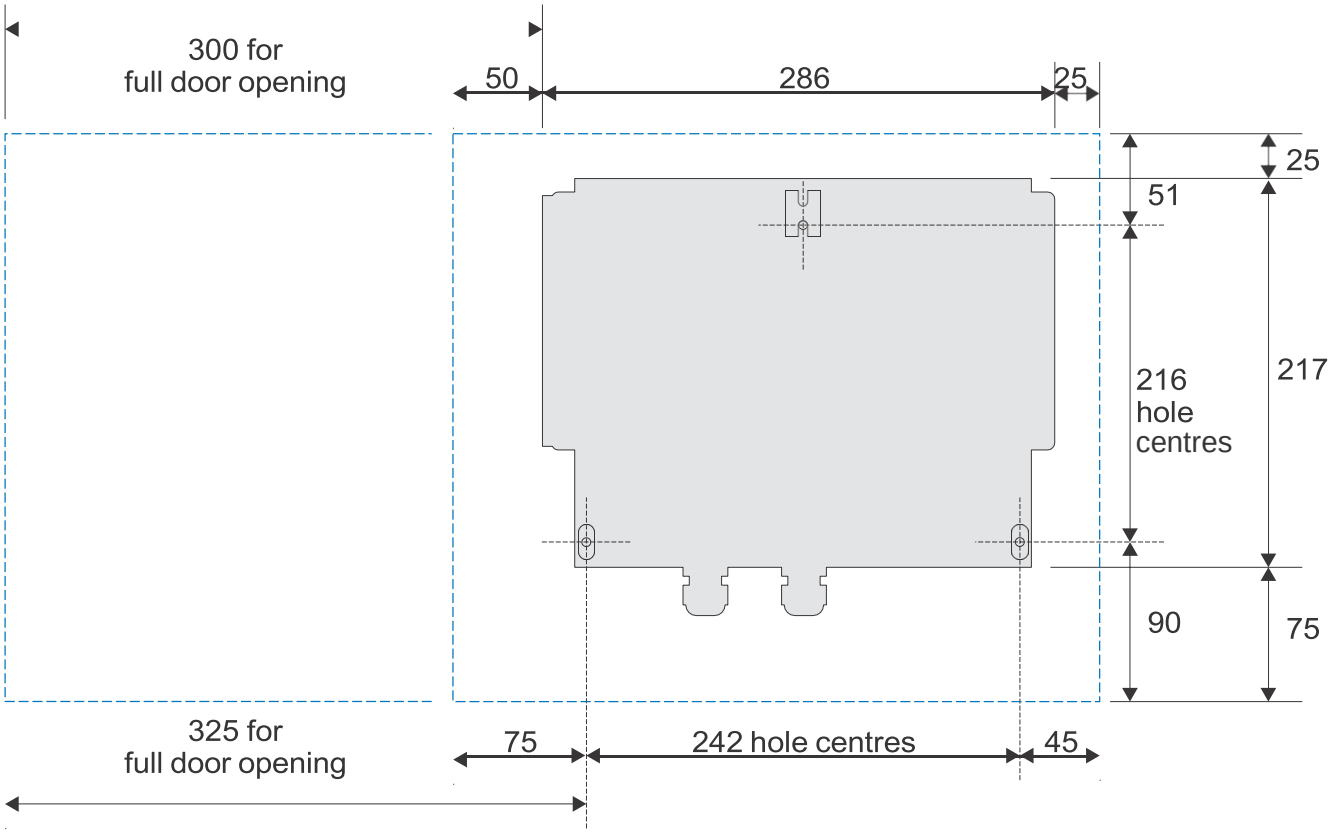
- The red “Power Indicator” will light to show that mains power is connected to the unit.
- The green “Clock Indicator” lights only when power is actually being supplied to the clock(s).

When the clock(s) are operating normally both indicators will be on. If the green indicator is off, then the clocks will not be operating. This will be because of either a mains power failure or automatic summer/winter (daylight saving) correction. DO NOT ATTEMPT TO ADJUST THE AUTO RESTART UNIT AS THE CLOCK(S) WILL AUTOMATICALLY RESTART AT THE CORRECT TIME.

3 INSTALLATION

3.1 Location

3.1.1 The unit is for internal use only and must not be installed where it will be subjected to great temperature variation or dampness, such as exposed walls, window openings etc., or direct sunlight. The unit must be easily accessible for maintenance and adjustments, and may be remote from the clock/s. A switchgear or plant room is an ideal location.



3.1.2 Allow clearance for access and wiring connections.

3.2 Installation Procedure

3.2.1 The unit must be installed by competent personnel in order that guarantees are not invalidated. INTERNAL USE ONLY (see 3.1).

3.2.2 Remove the lower panel (2 screws) for access to the lower fixing holes and the terminals.

3.2.3 Confirm the location of the unit and mark the TOP FIXING HOLE ONLY in the wall

3.2.4 Fit the top fixing screw into the wall and hang the unit.

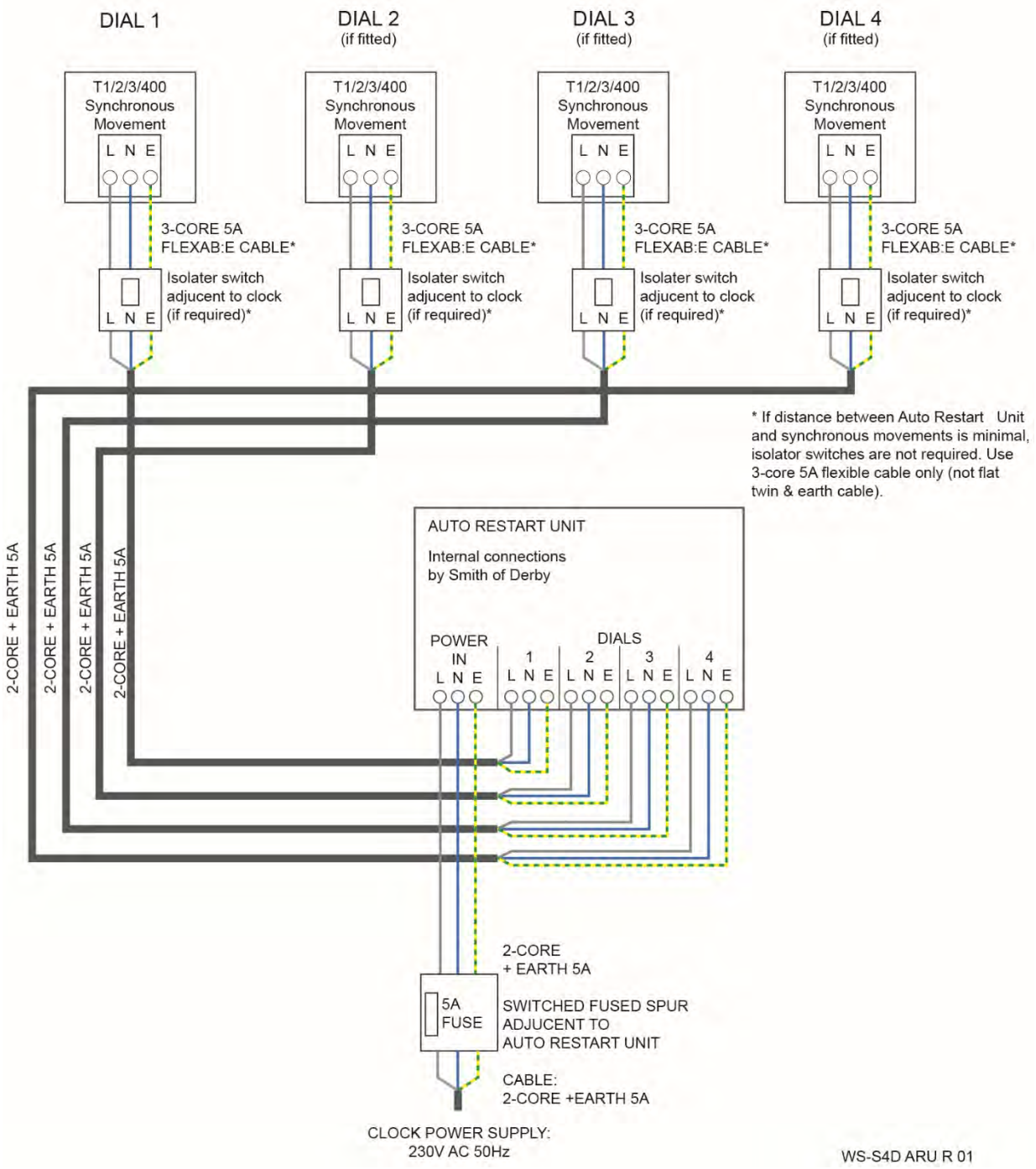
3.2.5 Mark through the two bottom fixing holes (access behind the lower panel).

3.2.6 Remove the unit from the wall and drill the two bottom fixing holes.

3.2.7 Secure with wall plugs and screws compatible with the wall material.

3.3 Power and clock connections

3.3.1 To comply with regulations, power cables and 5A switched fused spurs must be installed by the qualified site electrical contractor in readiness for Smith of Derby engineers to install the Auto Restart Unit.



Wiring diagram method 1

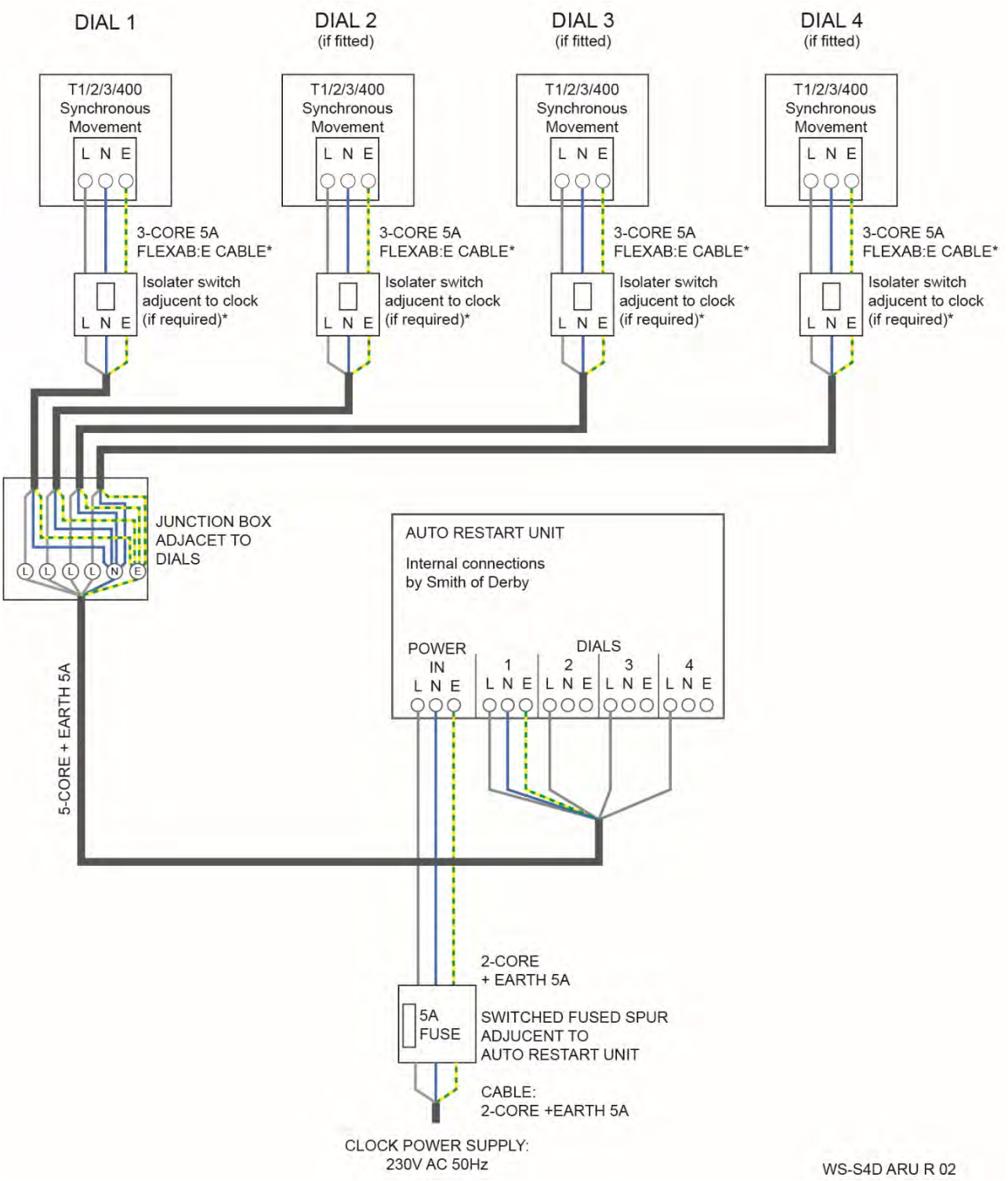
3.3.2 The wiring diagrams show the maximum number of clocks per Auto Restart Unit installation. Please disregard the wiring to dials 2, 3 and 4 if not required.

3.3.3 Each movement should be connected via an isolator switch when the clock movements are a distance from the Auto Restart Unit. These switches are used to isolate individual movements for maintenance.

3.3.4 Each clock movement also has its own individual switched live connector within the Auto Restart Unit, adjacent to the Clock Connections terminals for isolation purposes.

3.3.5 If the Auto Restart Unit is sited adjacent to the clocks, connections should be made as shown in wiring diagram method 1. This requires up to four separate cables from the unit to the individual clock movements.

3.3.6 If the Auto Restart Unit such close proximity to the clock movements that the isolator switches are not necessary, they may be omitted, and isolation be performed using the switches within the unit. The entire cable runs from the unit to the clock movements should be 3-core 5A flexible cable, secured to the wall or structure in accordance with regulations.

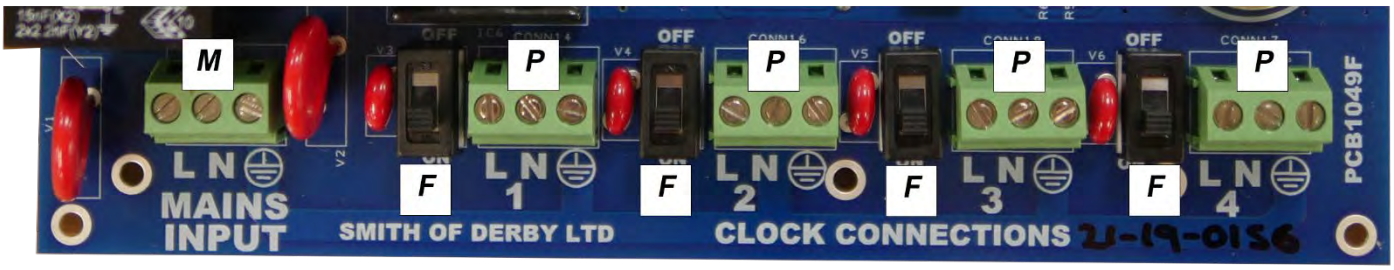


Wiring diagram method 2

3.3.7 If the Auto Restart Unit is sited remote from the clocks and the clocks are adjacent to each other, connections may be as shown in wiring diagram method 2 with the main run of fixed cable being up to 5 cores plus earth. As neutral connections are in parallel on the motherboard, only one neutral return is required between Auto Restart Unit and the clock movements. The same is true of the earth connection.

3.3.8 The multicore cable should be terminated adjacent to the clock movements in a junction box having 6 terminals. Use one terminal for each of the line connections, one for the neutral and one for the earth.

3.3.9 Each movement must be connected via an isolator switch as the clock movements are a distance from the Auto Restart Unit. These switches are used to isolate individual movements for maintenance.



3.3.10 Connect the incoming mains power supply to the MAINS INPUT connector (M)

3.3.11 Connect the clock movement(s) to the CLOCK CONNECTIONS 1 TO 4 (P) as required.

3.3.12 Ensure that the ON OFF switch/es (F) for each clock movement are in the ON position.

3.3.13 Replace the lower cover.

3.3.14 Turn on the Mains switched fused spur. The front panel LED will light if power is reaching the unit.

3.3.15 If the clock(s) hands have been pre-set to 12 o'clock then no further action is necessary as the Auto Restart will start the clock(s) at either 12 noon or 12 midnight, whichever is the closest to the actual time.

3.3.16 If the clock(s) have not been set to 12 o'clock and/or testing of the system is required then follow the start-up and test sequence in Chapter 4: Start Up and Testing.

3.4 Dial Identification

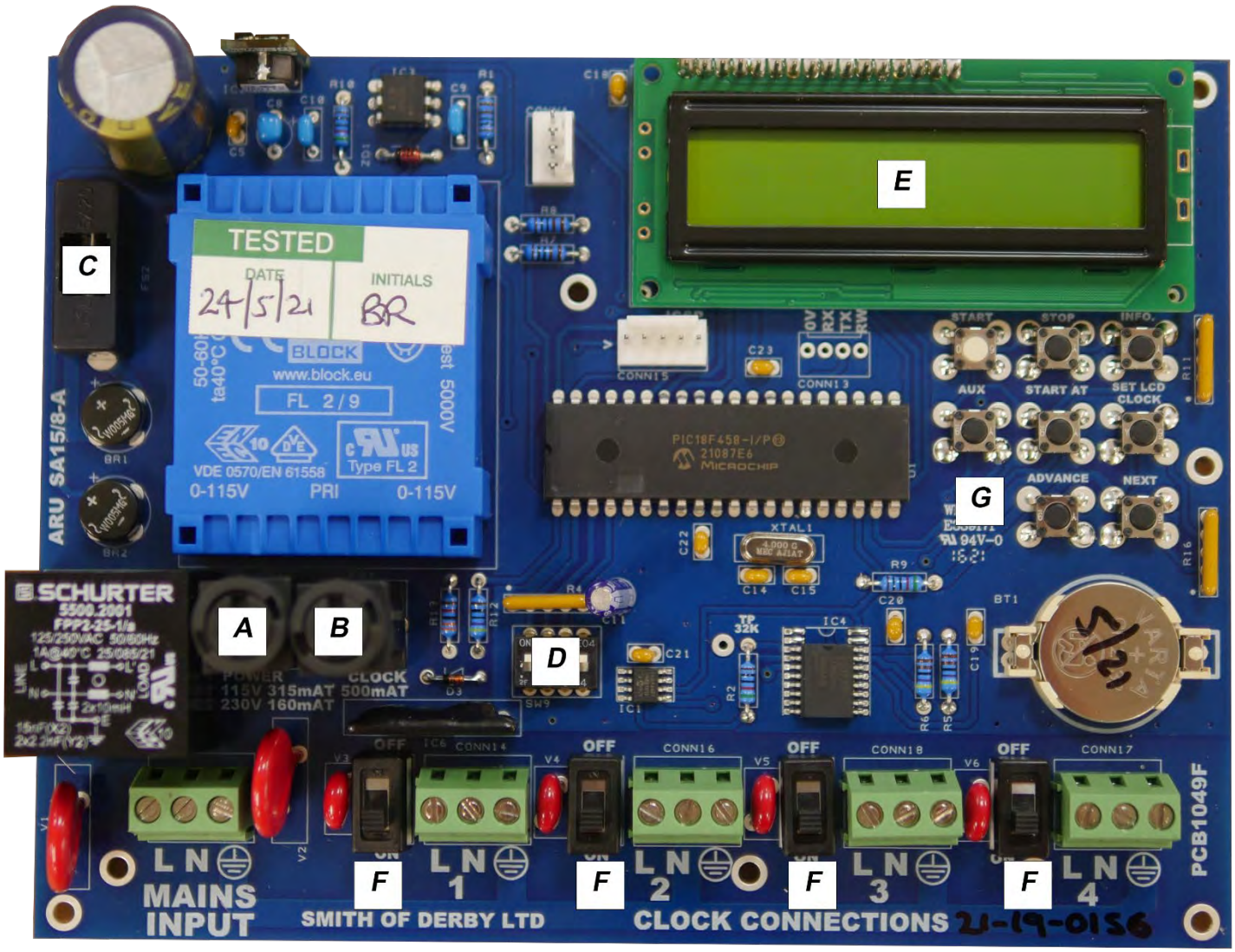
Corrector Switch No.	Dial Identification
1	
2	
3	
4	

3.4.1 In the table above, identify which clock dial is connected to which CLOCK CONNECTIONS terminal.

3.4.2 This information is essential, particularly where access to the dial/s is difficult. It will assist anyone who has the authority to maintain the clock. It will allow for the use of the corrector switches (F) to isolate each clock motor individually.

3.4.3 Use your own site specific description, such as North, South, Above Front Entrance or Facing Street etc.

3.4.4 We recommend that you also put this information on a label and apply adjacent to or inside the Auto Restart Unit.



Fuse		110-120V system	220-240V system
A	POWER FUSE	315mA T	160mA T
B	CLOCK FUSE	1A T	500mA T
C	LOW VOLTAGE FUSE	160mA T	160mA T

D	Function switches (factory set) Switch 2 and 4 should always remain in the ON position:	ON	OFF
	1	12 Hour	24 Hour
	3	Daylight saving on	Daylight saving off

E LCD display

F Clock corrector switches

G Setup buttons for LCD display

4 START UP AND TESTING

4.1 This sequence can be used to check the operation of the Auto Restart Unit (ARU) and the clock hands

- during the installation
- if the clock hands are set to a time other than 12 o'clock
- if a problem has arisen.

4.2 Power

4.2.1 When power is first applied to the ARU, the red LED will show on the front panel indicating mains power is reaching the unit.

4.2.2 If the red led is not lit, follow the procedure below.

WARNING: MAINS VOLTAGE INSIDE. REMOVAL OF COVER PANELS MUST ONLY BE CARRIED OUT BY A QUALIFIED ELECTRICIAN OR A SMITH OF DERBY OPERATIVE.

4.2.3 Visually inspect all connections.

4.2.4 Using a test meter check the MAINS INPUT terminals to check that incoming power is present.

4.2.4 Remove the four screws from the metal front panel and place the panel on top of the case.

4.2.5 If the LCD display is not operating, verify that the 3 internal fuses: POWER FUSE (A), CLOCK FUSE (B) and LOW VOLTAGE FUSE (C) are intact.

4.2.6 If all fuses are intact, contact Smith of Derby electronics department for advice.

4.4 Initial Start Sequence for the Clock Hands

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4.4.1 Remove the four screws from the metal front panel and place the panel on top of the case.

4.4.2 The top line of the LCD should be showing the current time of day and the lower line should say 'Restart at 12:00'. This indicates that the ARU is set to automatically turn on the power to the clock movements at the next occurrence of 12:00 real time (12:00 or 00:00 hrs).

4.4.3 If the Auto Restart Unit is for a clock which requires a 24 hour cycle (i.e. with night silencing), then switch D (1) should be put in the down position. '24 HR' is then displayed in the lower right of the LCD (instead of '12HR').

4.4.4 Check that the CLOCK CONNECTIONS switches 1 to 4 are in the ON position.

4.4.5 Replace the cover panels.

4.5 Starting The Clock Hands at a Pre-Determined Time

This allows the restarting of a stopped clock, or the resetting of a clock that is currently running but with the hands showing the wrong time. NOTE: it is important that the internal digital clock is at the correct time before using this function. See SETTNG THE DISPLAY TIME AND DATE (section 5). Note the exact time showing on the clock hands, and then use the following procedure:

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4.5.1 Remove the four screws from the metal front panel. Place the panel on the top of the case.

4.5.2 The LCD will be showing either 'Running' or 'Restart at'

4.5.3 Press the 'START' button.

4.5.4 Press the 'STOP' button. The LCD will show the current time and date, and 'Stopped' on the lower line.

4.5.5 Press the 'START AT' button. The LCD changes to 'Stopped @' with the left hand hour digit flashing. To escape the 'START AT' menu, press the 'AUX' button.

4.5.6 Press the ‘ADVANCE’ button to increment the hour digits to match the hours showing on the clock hands. Each press will advance the display by one hour.

4.5.7 NOTE: there is a difference between 12 and 24 hour mode.

Example:

12 hour mode: if a START AT time of 3 o’clock is entered, the clock being controlled will start at 03:00 or 15:00, whichever occurs first.

24 hour mode: if a START AT time of 3 o’clock is entered, the clock being controlled will start at 03:00 even if 15:00 occurs first.

4.5.8 Press the ‘NEXT’ button. The right hand minute digit will now flash.

4.5.9 Press the ‘ADVANCE’ button to increment to the exact minutes showing on the clock hands; again each press will increment the display by one minute.

4.5.10 Press the ‘NEXT’ button. The display shows ‘Restart at’ HH:MM (the hours and minutes of the current hand positions.

4.5.11 DO NOT PRESS ANY OTHER BUTTONS AT THIS STAGE AS THE CLOCK WILL AUTOMATICALLY START AT THE TIME JUST SET. The front panel can now be refitted. Check that the clock corrector switches are turned on and replace the lower case panel.

5 SETTNGS

WARNING: MAINS VOLTAGE INSIDE. REMOVAL OF FRONT PANEL MUST ONLY BE CARRIED OUT BY A QUALIFIED ELECTRICIAN OR A SMITH OF DERBY OPERATIVE.

Remove the four screws from the metal front panel. Place the panel on the top of the case.

5.1 Resetting the Display Time and Date

5.1.1 The unit is supplied with the date and time preset at the factory. If it needs to be reset for any reason, please use the following instructions when the clock is running.

5.1.2 The top line of the LCD shows the current time, then a letter to show whether the automatic daylight correction system is in (s)ummer, (w)inter or (o)ff /GMT mode and then the date (day, month and year). The time and date can be adjusted with either the clocks running or manually stopped.

5.1.3 Press the SET LCD CLOCK (G) button. The display shows a flashing block over the hour digit. Press the 'ADVANCE' button to increment the hour digits to match the hours showing on the clock hands. To escape the ' SET LCD CLOCK' menu, press the 'AUX' button.

5.1.4 Press NEXT. The flashing block moves over the minute digits. Press the 'ADVANCE' button to increment the minute digits to two minutes in advance of the minutes showing on the clock hands.

5.1.5 Press NEXT. The flashing block moves over the year digit. Press the 'ADVANCE' button to increment the year digits to the correct year.

5.1.6 Press NEXT. The flashing block moves over the month digit. Press the 'ADVANCE' button to increment the month digits to the correct month.

5.1.7 Press NEXT. The flashing block moves over the day digit. Press the 'ADVANCE' button to increment the day digits to the correct day. DO NOT PRESS NEXT YET.

5.1.8 The display should now show a time in advance of real time (by the two minutes added). When real time reaches the time displayed press the Next button. This will start the real time clock, indicated by the digit ceasing to flash.

5.1.9 Refit the front panel.

5.2 Resetting Summer/Winter (Daylight Saving) Time Changeover Dates

5.2.1 Remove front panel (see 5, above, and WARNING).

5.2.2 On the bottom left of the display the word 'Running' or 'Stopped' must be showing (if 'Restart at' is showing, press the START button followed by STOP if the clock is required to be stopped).

5.2.3 Press the push button AUX. For a short while display shows:

Display then shows last data entered with the S (in Sunday) flashing.

5.2.4 Press ADVANCE to select which Sunday of the month the change is to take place, i.e. 1st, 2nd, 3rd, 4th or last (this will include the 5th Sunday).

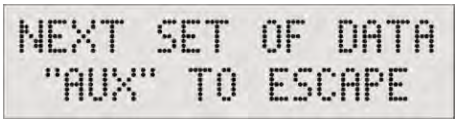
5.2.5 Press NEXT. The M (in Month) will flash. The month will currently be set to Mar (March).

5.2.6 Press ADVANCE to select the month of the first change of the year: Jan Feb Mar etc.

5.2.7 Press NEXT the / will then flash.

5.2.8 Press ADVANCE to select FOR (forward) or BAK (backward).

5.2.9 Press NEXT. Display will read:



Then change to:

5.2.10 Use ADVANCE to select the Sunday as before.

5.2.11 Press NEXT.

5.2.12 Press ADVANCE to go to the correct month.

5.2.13 If FOR (forward) was selected on the previous screen the BAK will now be selected and will be un-changeable.

5.2.14 Once NEXT has been pressed for the month, the ARU is set to operate as intended. In certain circumstances when there is a conflict between the previous clock change date and the new clock change date, the time on the display could automatically become an hour fast or slow to the current time. Therefore, check the digital clock is still correct.

5.2.15 Refit the front panel.

5.3 Manually Setting the Auto Restart

A manual reset of the auto restart function is required under certain circumstances, i.e. changing the back-up battery or correcting clock hands that are running slow.

5.3.1 Remove front panel (see 5, above, and WARNING).

5.3.2 Check that the LCD display is showing the correct time and date. If not then follow the procedure in section 5, SETTING THE DISPLAY TIME AND DATE.

5.3.3 If the time and date are correct press the STOP button to stop the clock movement/s.

5.3.4 Note the clock hands position to the nearest minute.

5.3.6 Press the START AT button and the display should show Stopped @ HH:MM on the bottom line with the hours digit flashing.

5.3.7 Use ADVANCE to change the hours digits to the correct hour as shown by the hands.

5.3.8 Press NEXT and the minutes digits should flash.

5.3.9 Use ADVANCE to set the minutes to correspond to the position of the minute hand on the clock.

5.3.10 Press NEXT to leave the auto restart set-up.

5.3.11 DO NOT press any other buttons at this stage as the unit is now programmed to automatically connect the mains to the clock movement at the time set.

5.3.12 Refit the front cover. The Auto Restart Unit will now wait for the next occurrence of the set re-start time.

5.4 Clock hands showing incorrect time

5.4.1 As the clock movement depends on the mains frequency (50Hz) for its accuracy it can gained or lost time over a period of a few months.

5.4.2 If there is easy access to the rear of the clock movement then it is usually possible to make the correction by mechanical means. However, the ARU can be used for clock correction as in 5.5 or 5.6 below.

5.4.3 If the clock hands are running fast it is just necessary to switch off the power to the movement until the real time catches up.

5.4.4 DO NOT turn the power to the Auto Restart Unit OFF and ON again as this will cause it to go into restart mode.

5.4.5 Remove front panel (see 5, above, and WARNING).

5.4.6 Check that the LCD display is showing the correct time and date. If not then follow the procedure in section 5.1, Setting The Display Time and Date.

5.5 Clock dial/s running FAST

5.5.1 To correct a SINGLE dial which is running fast, or up to four dials running fast by the same amount:

a Note the number of minutes the dial has gained.

b Press the STOP button and wait for the time to elapse.

c At the correct real time press the START button and the clock movement will restart.

5.5.2 To correct UP TO FOUR dials controlled from the same Auto Restart Unit and one or more dial is running FAST (you can correct multiple dials this way even if they are fast by different amounts of time):

a Remove the lower plastic CLOCK CONNECTION cover.

b Note the number of minutes the dial has gained.

c Locate the CLOCK CONNECTION switch controlling each of the affected dial/s.

d Slide the switch to the OFF position and the single clock movement will stop.

e At the correct time, slide the switch back to the ON position.

f Replace the cover.

5.6 Clock dial/s running SLOW

5.6.1 To correct a SINGLE clock dial that is running slow, or up to four dials running slow by the same amount, press the stop button.

5.6.2 Follow the procedure in section 5.3: Manually Setting the Auto Restart

5.6.3 To correct UP TO FOUR dials controlled from the same Auto Restart Unit and one or more dial is running SLOW (you can correct multiple dials this way even if they are slow by different amounts of time):

a Remove the lower plastic CLOCK CONNECTION cover.

b Note the number of minutes the dial has lost.

c Locate the CLOCK CONNECTION switch controlling each of the affected dial/s.

d Slide the switch to the OFF position and the single clock movement will stop.

e At the time each dial matches the time of the slowest dial, slide the switch back to the ON position.

5.6.4 When all dials are showing an identical time, follow the procedure in section 5.3: Manually Setting the Auto Restart

6 TIMEKEEPING MEMORY BATTERY

6.1 The memory back-up battery fitted to the ARU PCB has a life expectance of approximately 5 years. The button cell (type C2032) on the main PCB maintains the time and date settings in memory when the power supply is disconnected.

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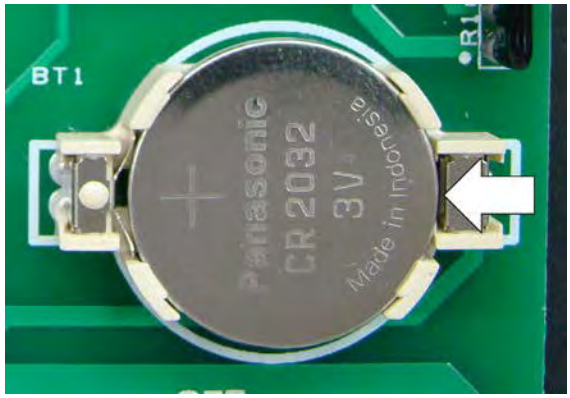
6.2 If there has been a power failure and the clock movements fail to resume operation on resumption of power, check to see if the LCD on the motherboard shows 00:00 Restart at HH:MM. If so, the battery will need to be replaced and the time and date reset. For the short term, the settings can be reinstated when the power is restored, but will be lost if the supply is interrupted again.

6.3 Before removal of the old battery, press the STOP button.

6.4 Remove the old battery by easing it out of the holder with a small screwdriver at the point shown by the arrow.



6.5 Replace the battery with a new one of the same type. Take care to insert at the correct polarity (+ uppermost).

6.6 Reset the time and date: see section 5.

6.7 Manually reset the Auto Restart. See section

6.8 Summer/winter (factory or custom) settings are not affected by timekeeping memory battery failure.

7 CARE AND MAINTENANCE

7.1 Regular care and maintenance is essential to ensure reliability of our products.

7.2 We recommend a visual inspection once a week to check on the condition and cleanliness of your clock movements, Auto Restart Unit and any other ancillary equipment, and the environment in which they operate, including the operation of any dial backlighting.

7.3 Take all precautions necessary to prevent the ingress of moisture, dust or dirt into the Inverter Charger Unit. Although it has a sealed splash proof cabinet, a closed cupboard or room is recommended if there is a risk of excessive dirt or any infestation.

7.4 If cleaning of the cabinet is necessary, use either a dry duster or brush, or a cloth moistened with a small amount of cleaning solution. Do not soak the cabinet or use any abrasive cleaning materials.

7.5 Our annual maintenance contract includes one visit by one of our qualified clockmaker engineers to perform a full test on your clock system, undertake lubrication and cleaning as required for reliable operation, and a full report on condition of the installation.

8 SITE INFORMATION AND CONTACT DETAILS

For future client and engineer reference, please record the following details. They will be required if contacting Smith of Derby for technical support or maintenance advice.

Site name/address where clock is located/stored: Smith of Derby site reference no. (if known)

…… ……

……

……

…… Clock site postcode ……

Smith of Derby Group local representative:

Name ……

Tel ……

Email ……

Local person in charge of this system:

Name ……

Address ……

……Postcode ……

Tel ……

Email ……

Any other details ……

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