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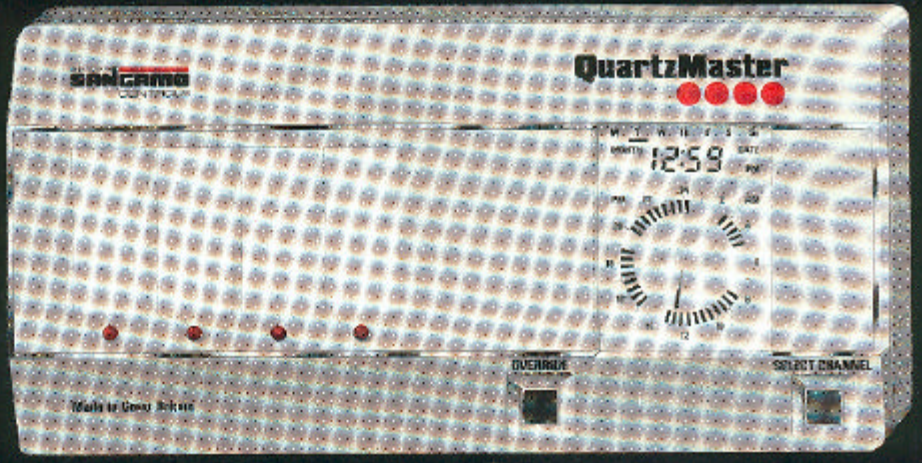
QuartzMaster

Electronic Time Switch

SANGAMO CONTROLS



INSTALLATION AND USER INSTRUCTIONS

To be left with the USER

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TABLE OF CONTENTS

QuartzMaster

Schlumberger

INTRODUCTION

QuartzMaster

General

You are now the owner of the latest design of electronic time switch incorporating years of Sangamo experience for reliability and first class workmanship.

Please read the following instructions carefully, they describe the recommended methods of installing and programming the time switch.

Guarantee

The switch is guaranteed by your supplier for two years from the date of purchase. If it should become defective, please contact your installer or supplier for a replacement unit.

The guarantee becomes invalid if the electronic circuitry has been tampered with, or if the switch has been abused or installed in an unsuitable environment.

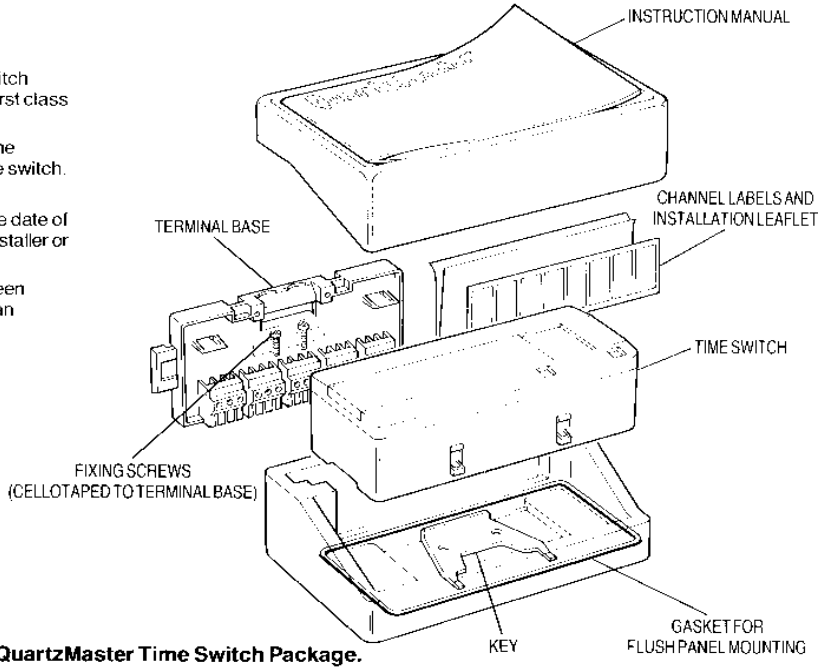

Fig 1. The QuartzMaster Time Switch Package.

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INSTALLATION INSTRUCTIONS

QuartzMaster

Surface Mounting

The QuartzMaster Electronic Time Switch is designed to suit several different methods of surface mounting.

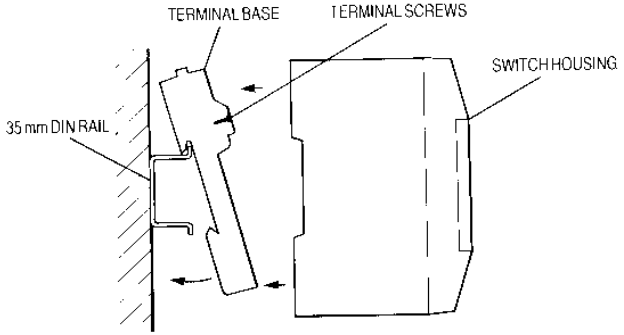

Fig 2. METHOD A – Standard 35mm 'Top Hat' DIN Rail Mounting.

a) Remove the plastic insert from the terminal base.

b) Clip the terminal base to the DIN rail. It can be locked to the rail by using self-tapping screws through the holes in the terminal base.

c) Check that all wiring is electrically isolated and pass the mains and switch cables through the aperture in the terminal base.

d) Connect the mains cable and switch cables as shown in Figure 5.

e) Locate the time switch on the terminal base and push firmly into position.

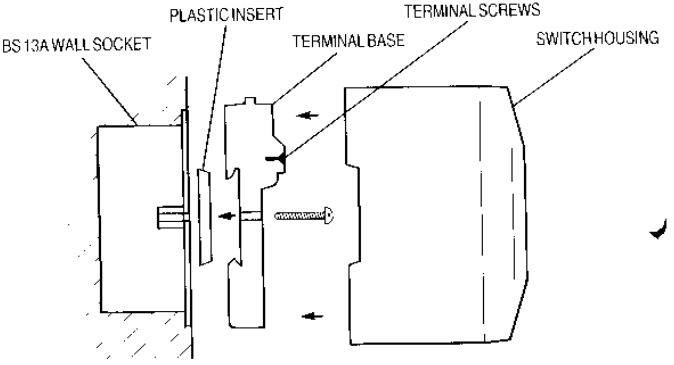

Fig 3. METHOD B – Wall-Mounting to Single or Double-Gang Conduit Box (To BS 1363)

a) Check that all wiring is electrically isolated and pass the mains and switch cables through the aperture in the terminal base.

b) Insert the socket box screws through the appropriate holes in the terminal base and plastic insert. Secure the base in position.

c) Connect the mains and switch cables as shown in Figure 5.

d) Locate the time switch on the terminal base and push firmly into position.

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INSTALLATION INSTRUCTIONS

QuartzMaster

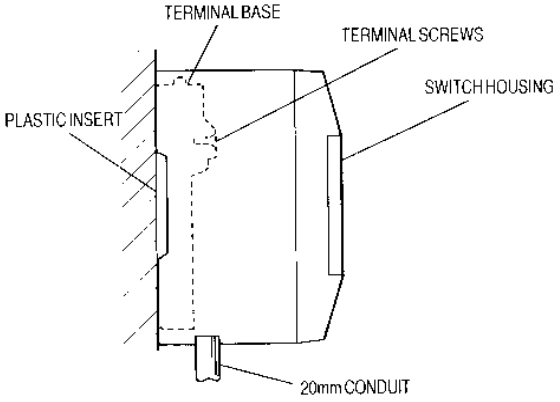

Fig 4. METHOD C – Wall-Mounting.

a) Screw the terminal base direct to the wall through the plastic insert.

b) Check that all wiring is electrically isolated and pass the mains and switch cables, which may be in 20 mm conduit, up from the bottom of the terminal base within the centre portion of the base, checking the relationship with the fitted shroud conduit entry.

c) Cut out the appropriate cable entry on the bottom of the time switch shroud to allow the time switch to be fitted to the terminal base.

d) Connect the mains and switch cables as shown in Figure 5.

e) Locate the time switch on the terminal base and push firmly into position.

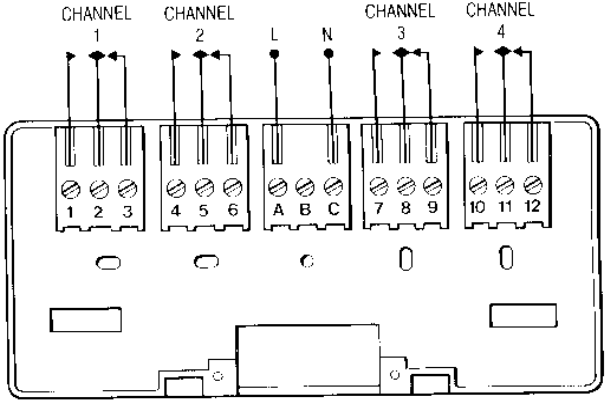

Fig 5. Electrical Connections – Surface Mounting Only

NOTE: Maximum cable size: 2.5mm
Maximum switch current: 10A (resistive)

IMPORTANT NOTE:
Although every care is taken to ensure the accuracy of the electrical circuit diagram shown, Sangamo Controls or associated companies cannot be held responsible or liable for circuit connections other than those directly associated with the QuartzMaster.

Electrical Connections

Installation to conform to I.E.E. Regulations. If in doubt concerning the installation, consult a qualified electrician.

INSTALLATION INSTRUCTIONS

Flush Panel Mounting

The QuartzMaster Electronic Time Switch is suitable for flush panel mounting. This mounting method involves rotating the terminal base through 180° such that the terminals may be connected from the rear of the panel with the switch in position and fully assembled. With the terminal base in this position, connection to the base must be made as shown in Figure 7.

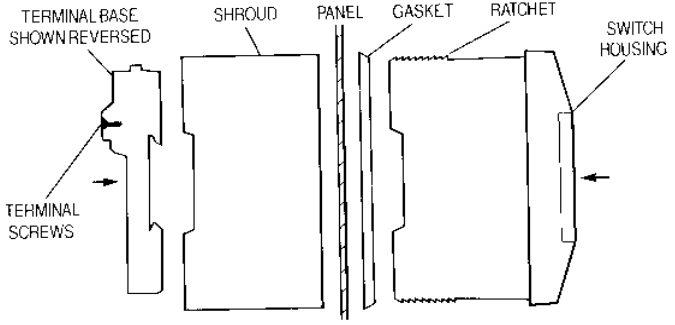

Fig. 6 Mounting the Switch in a DIN Standard Cut Out

a) The QuartzMaster time switch is suitable for mounting in a DIN Standard panel cut out (186mm × 92mm) No. A 186 × 92 DIN 43700.

b) Remove the plastic insert from the terminal base.

c) Remove the time switch shroud as shown in Figure 9 using screwdrivers.

d) Fit the gasket supplied over the time switch and place the switch through the panel cut-out.

e) Hold the switch in position from the front of the panel and fit the shroud over the back of the switch. Push the shroud forward until the switch is held firmly by the ratchet mechanism.

f) Turn the terminal base so that the face shown in Figure 7 is pointing away from the time switch. Locate the terminal base at the back of the time switch and push firmly into position, supporting the front switch housing.

g) Check all wiring is electrically isolated and connect the mains and switch cables as shown in Figure 7.

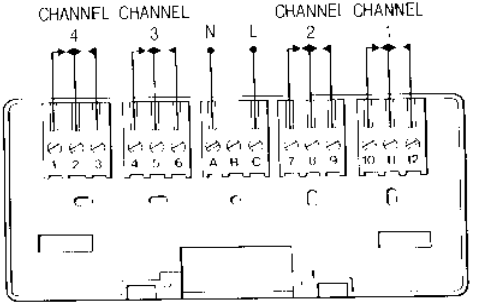

Fig 7. Electrical Connections – Flush Panel Mounting Only.

NOTE: Maximum cable size: 2.5mm
Maximum switch current: 10A (resistive)

IMPORTANT NOTE:

Although every care is taken to ensure the accuracy of the electrical circuit diagram shown, Sangamo Controls or associated companies cannot be held responsible or liable for circuit connections other than those directly associated with the QuartzMaster.

Electrical Connections:

To conform to I.E.E. Regulations. If in doubt, consult a qualified Electrician.

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INSTALLATION INSTRUCTIONS

QuartzMaster

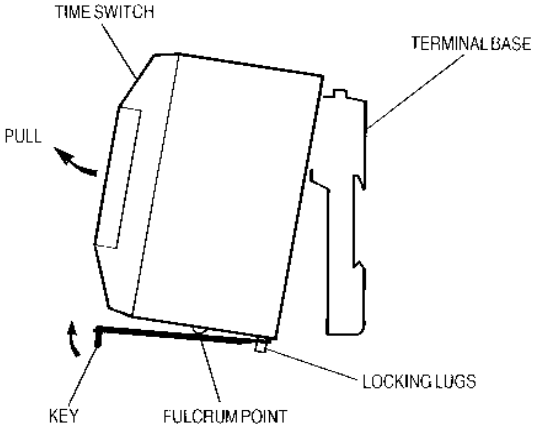

Fig. 8 To Remove The Time Switch From The Terminal Base

a) Fit the key provided in the holes in the locking lugs at the bottom of the switch housing.

b) Lever the key upwards to release the locking lugs and pull the switch housing away from the terminal base.

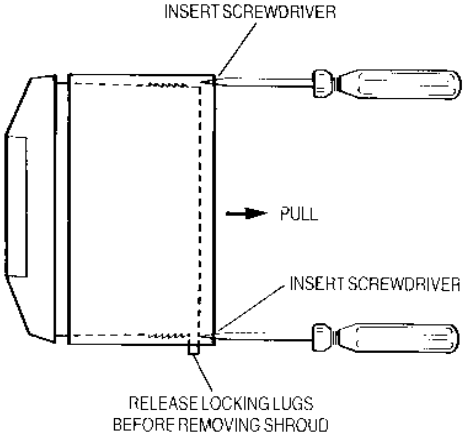

Fig. 9 To Remove The Shroud (for Flush Panel Mounting)

a) Insert screwdrivers in the slots provided top and bottom of the shroud and slide the shroud away from the switch housing.

b) To remove shroud, release locking lugs after ratchets are disengaged.

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INSTALLATION INSTRUCTIONS

QuartzMaster

Figure 10 shows the method of assembly of the time switch. All external wiring is connected to the terminal base, which is either surface mounted using the required method, or rotated through 180° for flush panel mounting. The time switch plugs into the terminal base, and may be removed from the terminal base, for servicing or replacement, using the key provided to release the locking lugs. The switch may therefore be completely removed, without the necessity to disconnect any wiring from the terminal base.

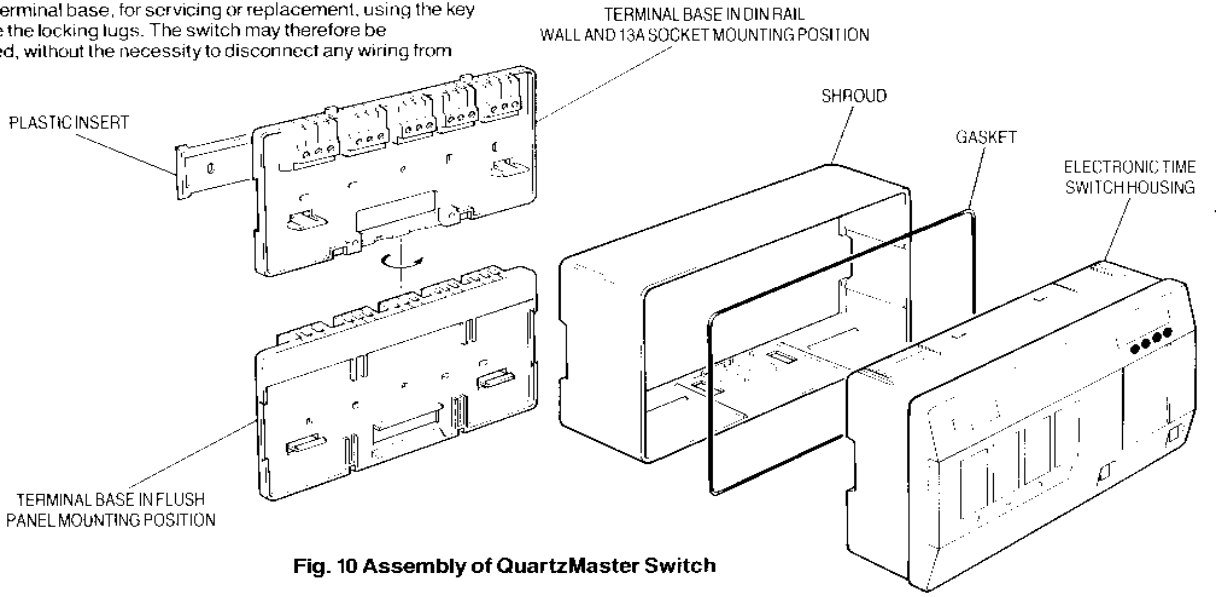

Fig. 10 Assembly of QuartzMaster Switch

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TESTING THE TIME SWITCH

QuartzMaster

The following test should be carried out by the installer to check that the digital and analogue displays are functioning correctly. The test assumes that the switch is newly installed and that the digital clock has not been set.

When the QuartzMaster Electronic Switch is installed and the mains supply energised, the switch will immediately show the preset **ON** programme from 7am to 5pm. Since the digital clock is not set, the digital display will show C01 and the analogue hand will appear vertically upwards.

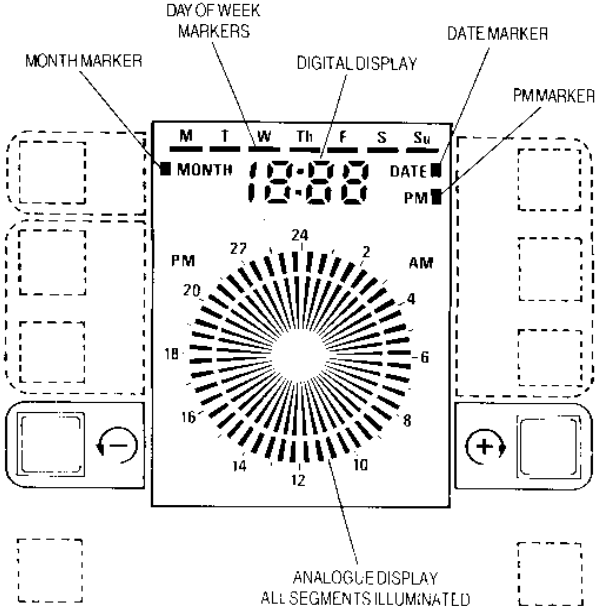
All segments of the analogue and digital display should be tested for operation as follows:

a) Open the window of the time switch using the key provided and simultaneously press the + and − buttons.

b) All segments of the analogue and digital display should be illuminated as shown. If any segments are not illuminated the switch should be returned to your supplier for replacement.

c) Set the digital clock as described on Page 14.

NOTE: Pressing the **SET CLOCK** will change the switch from the test mode to the Set Clock mode. Pressing the + and − buttons simultaneously after the digital clock is set will change the switch from the Normal Operating Mode, (see Page 13) to the test mode. however, the switch will automatically return to the Normal Operating Mode within 75 seconds.



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SPECIFICATIONS

QuartzMaster

No. of Output Channels	:	Up to four independently programmable channels.
Programming Capability	:	7-day programmable. Each channel may be programmed differently.
Max. No. of Status Changes	:	Up to 48 ON/OFF operations per day for each channel.
Override Facility	:	Energy-saving, automatic, 2Hr, 'Boost-On' to next programmed 'Off'.
Digital Display	:	Seven segment display to 1-minute resolution; set to the second.
Analogue Display	:	24-hour display with 30-minute programme indication and 15 minute switching capability.
Battery Back-Up	:	Automatically rechargable battery will retain memory and display for a minimum of 48-hours.
Battery Recharge Time	:	Battery will automatically fully recharge within 96-hours.
Rating of Output Switches	:	10 amp (resistive) – changeover SPDT contacts
Ambient Temperature Range	:	10°c to 50°c
Supply Voltage	:	220/240Vac 50/60 Hz
Max. Cable Size	:	2.5mm
BST/GMT Changeover	:	Automatic, if required.
Accuracy	:	Better than 5 minutes per annum.
Protection	:	Dirt, moisture and shock protection designed to BS3955.
Guarantee	:	2-years
Mounting	:	Wall mounting, 35mm 'Top Hat' DIN Rail. Single or Double Standard Conduit Box or Flush Panel mounting.
Packaging	:	In energy absorbent polystyrene box and cardboard outer case.
Instructions	:	Full instructions contained in handbook. Additional programming instructions reminder on product label. Additional installation instructions included in packaging.

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USER INSTRUCTIONS

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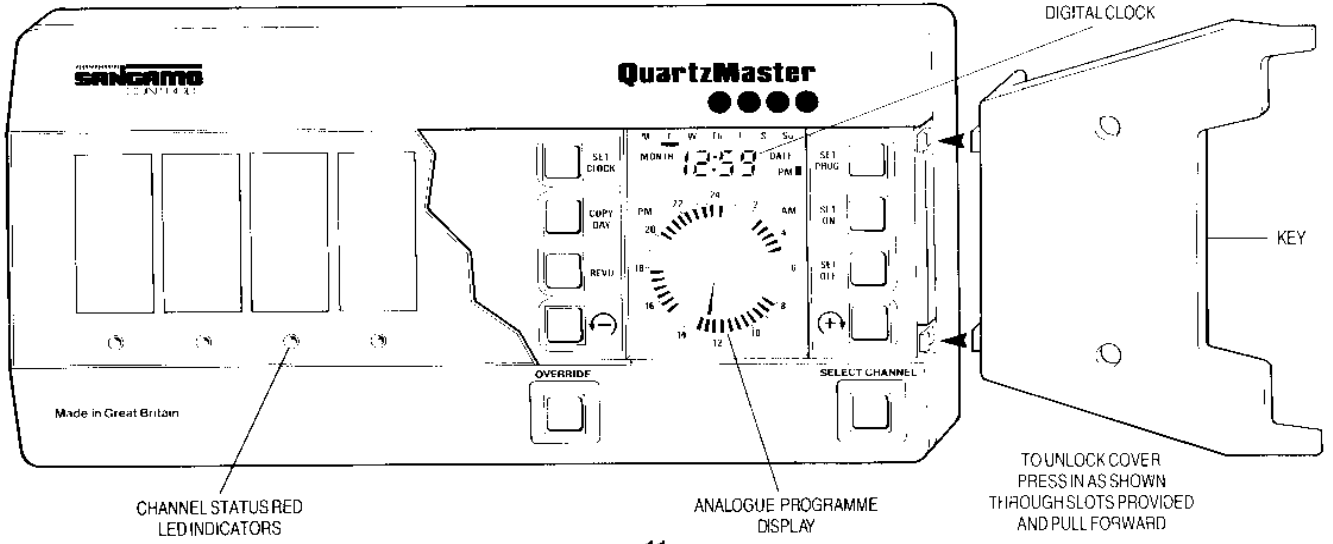
The QuartzMaster E900 Series Electronic Time Switches are supplied with either two or four output channels, each channel rated at 10A (resistive). The function of each channel is described by the installer on paper labels fitted above the appropriate status indicator LED. (Paper labels are supplied with the time switch.)

The QuartzMaster may be programmed to independently control the switch status of each channel for each day over a seven-day cycle, and may contain 'On' or 'Off' instructions in multiples of 15 minutes over each 24-hour period.



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THE ELECTRONIC DISPLAY

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The QuartzMaster features a liquid crystal display incorporating an analogue programme display showing the switching programme in relation to a 24-hour analogue clock, and a digital clock.

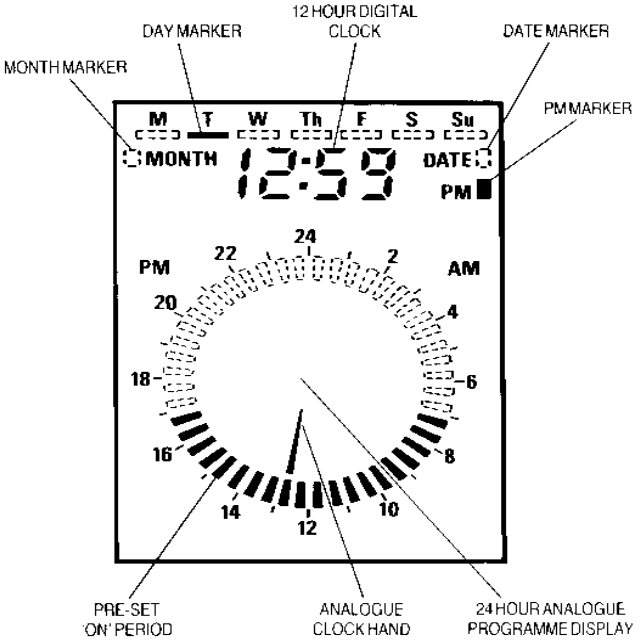
The analogue programme display shows programmed switching 'On' periods, represented by means of electronic markers as shown, and an analogue 'hand' showing the time on the 24-hour clock.

The digital display comprises a 12-hour digital clock and electronic markers to show PM, day of the week, date and month.

A preset switching 'On' period for each output channel from 7am to 5pm is automatically programmed into the time switch memory and will appear on initially connecting power to switch. The time switch will also revert to the preset switching programme in the event of the mains supply being disconnected for a period in excess of 48 hours.

NOTES:

1. The digital clock display must be set when the mains supply is initially connected to the switch and after restoration of supply following disconnection for a period in excess of 48-hours. For alterations to the preset programme - see "Programming the Time Switch".
2. When the supply is disconnected and the time switch is powered by the battery, the user's attention is drawn by the current display flashing on and off.



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NORMAL OPERATING MODE

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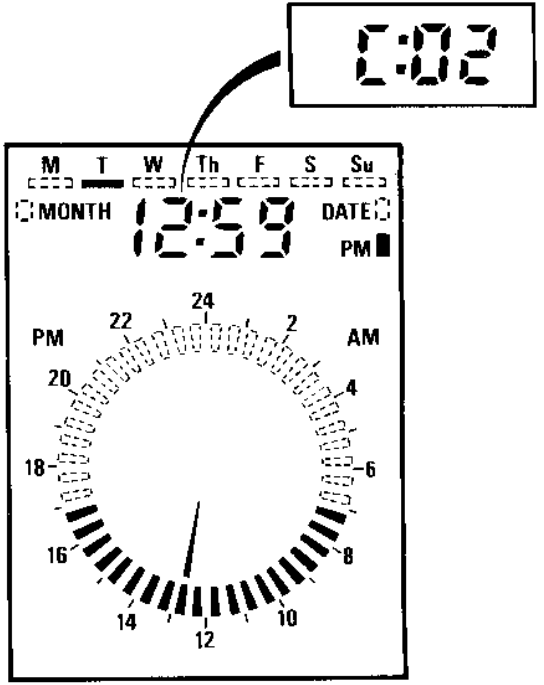
In the normal operating mode, the preset or programmed switching programme is displayed continuously on the analogue programme display. The analogue 'hand' will point to the actual time on the 24-hour analogue display and the digital clock will indicate the time and the day of the week.

In the normal operating mode, the programme for each channel will be displayed on the analogue programme display for a period of 15 seconds, before changing to display the next channel programme. The analogue hand will point to the actual time on the 24-hour clock, and the digital clock will alternate between the time and the channel number corresponding to the channel programme being displayed on the analogue programme display.



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SETTING THE DIGITAL CLOCK

QuartzMaster

The digital clock must be set to the actual time, day of the week. month and date on installation and following disruption of the mains supply for a period in excess of 48-hours.

NOTE: The QuartzMaster incorporates an internal, continuously charged battery which supplies power to the display and retains the preset programmes within the unit memory during a power failure (maximum 48-hours). The battery will automatically recharge to full power within 96-hours.

Open the window of the time switch using the key provided and set the digital clock as follows:-

1. Set Minutes

a) Press the **SET CLOCK** button. The minutes display will flash on and off.

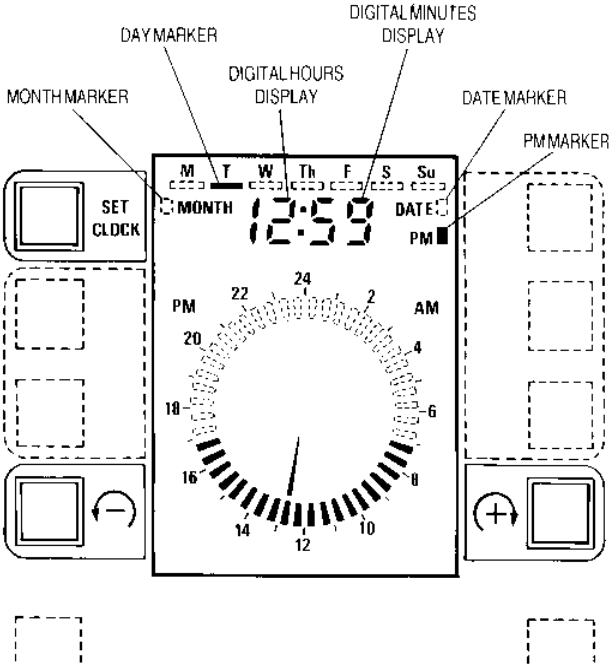
b) Press + or − button until the correct minutes setting is displayed.

c) Press **SET CLOCK** to enter the set minutes in the unit memory. The digital hours will now be flashing on and off.

2. Set Hours and PM Marker

a) Press the + or − button until the correct hours setting is displayed and the PM marker is illuminated as appropriate.

b) Press **SET CLOCK** to enter the set hours in the unit memory. The day of the week marker will now be flashing on and off.



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SETTING THE DIGITAL CLOCK

QuartzMaster

3. Set the Day of Week

a) Press + or -- button until the day of the week marker is located below the correct day of the display.

b) Press **SET CLOCK** button to enter the set day in the unit memory. The 'Month' marker will now be flashing on and off and the last two digits on the digital clock will display 01 and flash on and off.

4. Set the Month of Year.

a) Press + or – button until the digital clock shows the correct month number of the year.

b) Press **SET CLOCK** button to enter the set month in the unit memory.

The 'Date' marker will now be flashing on and off and the last two digits of the digital clock will display 01 and flash on and off.

5. Set the Date of Month

a) Press the + or – button until the digital clock shows the correct date of the month.

b) Press **SET CLOCK** button to enter the set month number in the unit memory. The digital clock is now set and the switch will automatically revert to the Normal Operating Mode.

NOTES:

1. The + or – buttons can be pressed and released to increment or decrement the digital display by one digit, or held pressed to continuously advance (or retard) the display. A delay of 1-second will occur before the digital display will move continuously.
2. QuartzMaster can be supplied to automatically change from **GMT** to **BST** (or equivalent) and back again on the appropriate date, if required.
3. Every four years the date must be reset on the second of March of each leap year to reset the date to 1st March.
4. When the QuartzMaster returns to the Normal Operating Mode after setting the digital clock, any channel(s) which were previously in the 'Override' mode will be set to the normal operating condition and the 'Override' cancelled.

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PROGRAMMING THE TIME SWITCH

QuartzMaster

All E900 QuartzMaster Electronic Time Switches are despatched from the factory programmed with a standard 'On' period from 7.00am to 5.00pm for each day and for each channel.

NOTE: The switch will be programmed with the preset 'On' period from 7.00am to 5.00pm on initially energising the switch and when the switch is re-energised from the mains following a power disruption for a period in excess of 48-hours.

The programme is displayed on the analogue display for each day in accordance with the actual or selected day of the week. Discrete electronic markers on the analogue programme display represent a switch 'On' period and the absence of markers represents a switch 'Off' period.

Programming the time switch to a programme other than that set at the factory is achieved by 'painting in' or 'wiping out' 'On' markers as the analogue hand is moved around the 24-hour clock display in either direction using the + or − buttons.

NOTES:

1. It is adviseable that the intended **ON/OFF** programme is plotted on the programme chart at the rear of this manual before programming the time switch.
2. When programming the time switch it is recommended that the complete week's programme is entered into the unit memory for one channel, before proceeding to programme another channel.
3. The QuartzMaster will automatically revert from the **SET PROG** mode to the Normal Operating Mode 5-minutes after the last button is pressed. This feature protects the external circuits against the time switch being accidentally left in the **SET PROG** mode.

Open the time switch window using the key provided and programme the switch as follows:-

a) Select the channel to be programmed by pressing the **SELECT CHANNEL** button.

b) Press the **SET PROG** button. The analogue 'hand' will move to the vertical position at the top of the display and will be flashing on and off. The day of the week marker will take up a position below M (Monday). The digital clock will show the channel number selected (channel 1 to channel 4).

NOTE: Should it be necessary to programme or amend programmes for specific days the particular day's programme can be selected by pressing the **SET PROG** button until the day marker is located below the required day of the week, then proceed as follows:-

c) Press the + or − button. The analogue hand will move around the analogue clock in the appropriate direction. The + or − buttons can be pressed and released to increment (or decrement) the analogue hand (and digital clock) by 15 minutes, or held pressed to continuously advance (or retard) the hand and digital time. A delay of 1-second will occur before the hand and (digital clock) will move continuously. The digital clock will follow in direction and time in 15-minute steps. When the analogue hand approaches the point where it is required to 'paint in' or 'wipe out' an 'On' period, release the + or − button. The desired switching time (as displayed on the digital clock) can be approached in the 15-minute steps by momentarily pressing the + or - button.

PROGRAMMING THE TIME SWITCH

QuartzMaster

To 'Paint In' an 'On' Period.

d) When the digital display shows the required time to 'Paint in' an 'On' period momentarily press the **SET ON** button. The time switch will change to the 'Paint In' mode, and further rotation of the analogue hand around the clock in either direction will set the programme for an 'On' Period. An 'On' marker will be 'painted in' on the display for every two depressions of the + or − button.

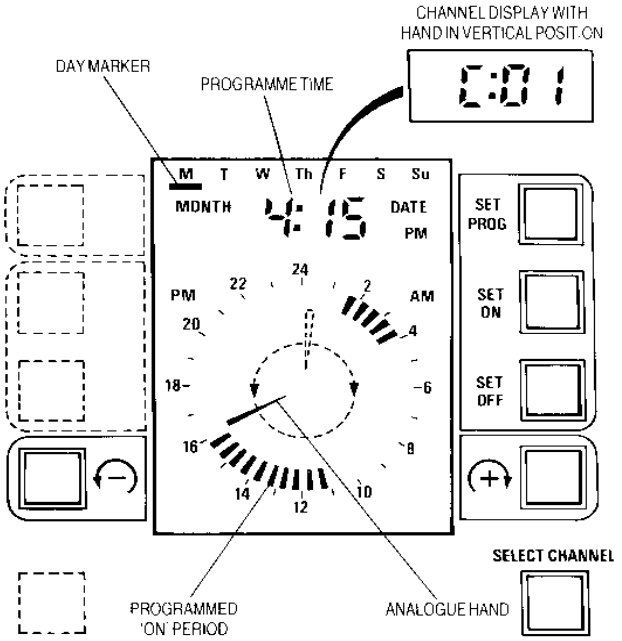
To 'Wipe Out' an 'On' Period

e) When the digital display shows the required time to 'Wipe Out' an 'On' period, momentarily press the **SET OFF** button. The time switch will change to the 'Wipe Out' mode, and further rotation of the analogue 'hand' in either direction will delete the programmed 'On' Period. One 'On' marker will be deleted for every two depressions of the + or − button.

NOTES:

1. The **SET ON** and **SET OFF** buttons incorporate a toggle feature. Pressing either button once will set the time switch in the appropriate mode ('Paint in' or 'Wipe out'). Pressing either button again will set the time switch in the 'neutral' mode, neither 'painting in' or 'wiping out'. This feature is useful when amending existing programmes, enabling the hand to 'skip' over existing 'On' or 'Off' periods without changing the setting.
2. When the **SET ON** button is pressed, an 'On' marker will immediately appear on the analogue programme display. The 'On' marker initially represents an 'On' period of 15 minutes. Momentarily pressing the + or − button will advance (or retard) the digital clock by fifteen minutes but will not move the analogue hand. After the second depression of the + or − button, the analogue hand will move in the appropriate direction by 30 minutes, and add a second 'On' marker to the analogue display. It is therefore possible to set an 'On' or 'Off' period beginning when the digital clock minutes display shows 00, 15, 30 or 45 although the analogue display will show the 'On' period as a 30 minute segment.

f) By use of the **SET ON**, **SET OFF**, + or − buttons the desired programme for Monday can be constructed for the selected channel.



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PROGRAMMING THE TIME SWITCH

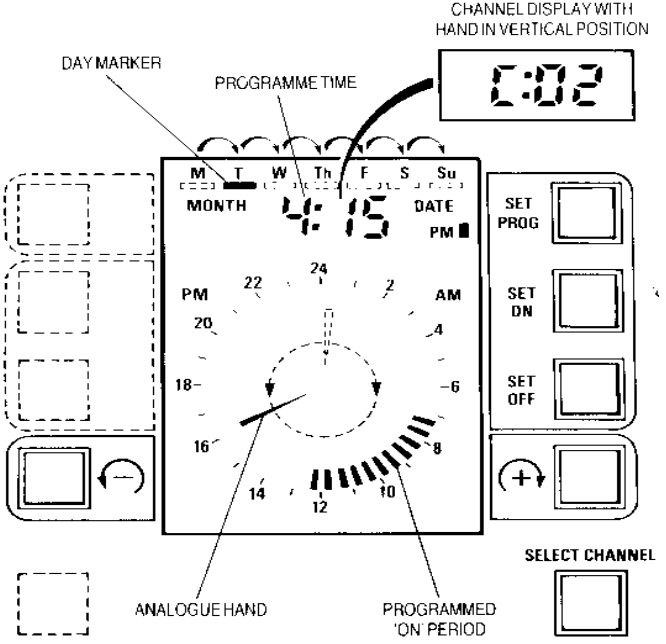
QuartzMaster

g) Press the **SET PROG** button to set the programme for Monday into the unit memory.

h) The day of the week marker will then be positioned below T (Tuesday). The programming procedure is repeated as previously described and the Tuesday programme entered into the unit memory by pressing the **SET PROG** button.

i) The procedure is repeated for each day of the week until programming is completed for Sunday. The week's programme is now contained in the unit memory for the selected channel and the QuartzMaster will return to the Normal Operating Mode.

j) The programme for each output channel is entered in the unit memory by repeating steps (a) to (i) of the programming procedure for the appropriate channel number.



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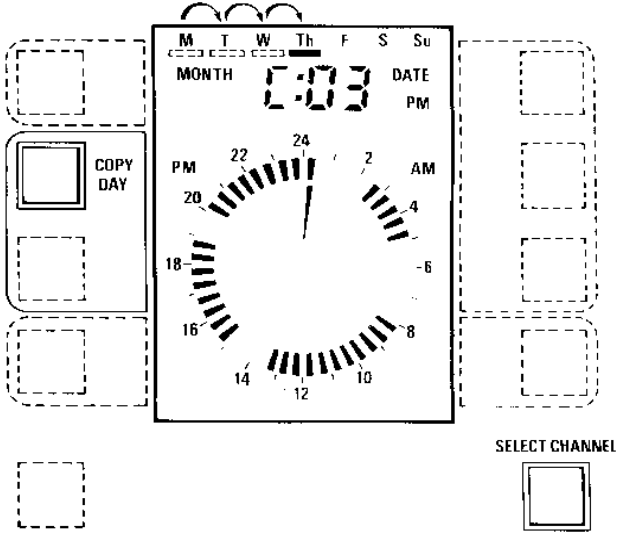
COPYING PROGRAMMES

When programming is complete for one day, and the same programme is required for the next and subsequent days, the programme can be copied by pressing the **COPY DAY** button.

NOTE:
The **COPY DAY** button enters the first day's programme into the unit memory and changes the day marker to the next day. The **COPY DAY** button should be pressed instead of the **SET PROG** button as in steps (g) and (h) of the programming procedure. Pressing the **COPY DAY** button again will enter the day's programme into the unit memory and advance the day marker to the next day.



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PROGRAMME REVIEW

A review feature, incorporated within the QuartzMaster enables the user to check the programme in the unit memory for each day and for each channel, without affecting the normal operation of the time switch or without the risk of altering the programmes.

To Review the Week's Programmes.

Open the window of the time switch using the key provided and review the programmes as follows:-

a) Select the channel number to be reviewed by pressing the **SELECT CHANNEL** button until the digital display indicates the required channel number.

b) Press the **REVU** button. The digital display will show the channel number, and the day of the week marker will be located below M (Monday).

c) The analogue programme display will show the programme for Monday for the channel selected.

d) Press the **REVU** button again and the analogue programme display will change to show Tuesday's programme and the day of the week marker will move to T (Tuesday).

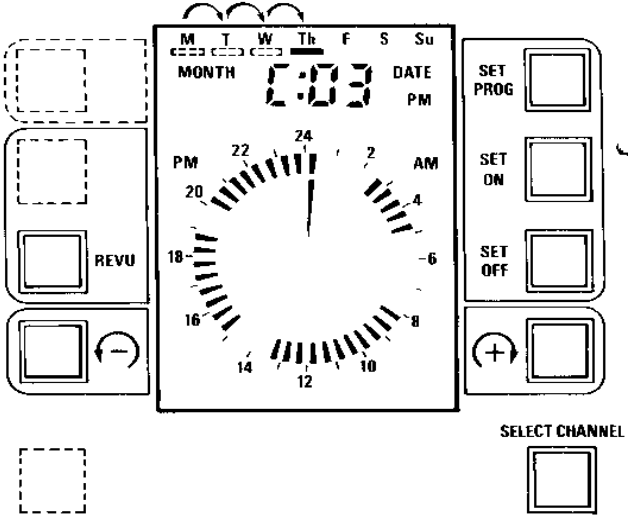
e) By pressing the **REVU** button after viewing each day's programme, the weeks programmes for the selected channel can be examined.

f) Pressing the **REVU** button after viewing Sunday's programme will return the time switch to the Normal Operating Mode.

g) The review procedure can be repeated for each channel by selecting the channel number and repeating steps (b) to (f).

NOTE:
Should the time switch be accidentally left in the **REVU** mode, the switch will automatically return to the Normal Operating Mode 5-minutes after pressing the last button.

The **REVU** feature can also be used to check the exact On/Off times of the programme as follows:



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PROGRAMME REVIEW

QuartzMaster

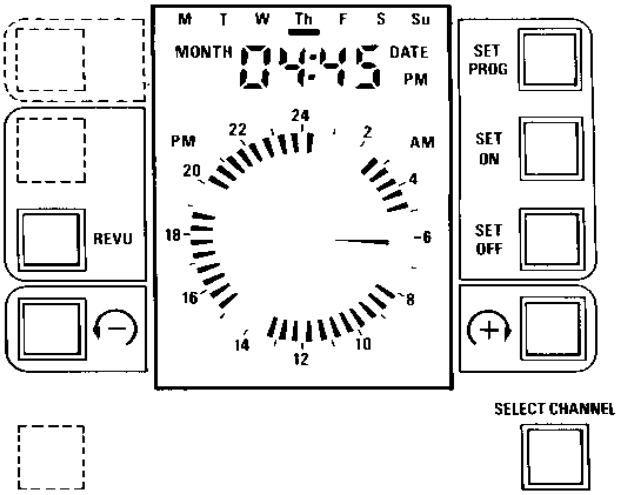
To Review Programme Settings

a) Select the channel number using the **SELECT CHANNEL** button.

b) Press the **REVU** button until the day marker is located below the day to be reviewed.

c) Press the + or − button to rotate the analogue 'hand' round the programme display. The digital display will continue to show the channel number until the 'hand' crosses an 'On' or an 'Off' period. The digital display will immediately change to display the time of the change of state. This time will remain displayed until the next change of state, when the digital display will change to show the time of that change of state. By rotating the 'hand' around the analogue display, the time of each change of state can be noted from the digital display.

d) The time switch is returned to the Normal Operating Mode by pressing the **REVU** button repeatedly until the day of the week marker is located below Su (Sunday). Pressing the **REVU** button again will return the switch to the Normal Operating Mode.



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PROGRAMME REVIEW

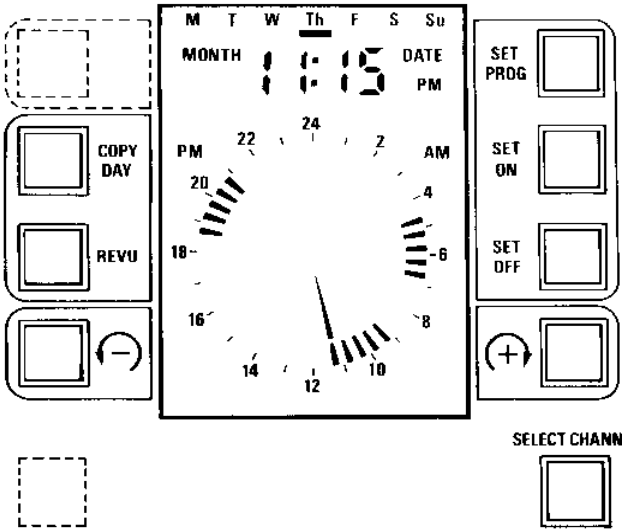
QuartzMaster

Amending a Programme While Reviewing

Any programme under review may be amended by pressing the **SET PROG** button. This will change the switch to the programming mode, and the programme, may be amended using the **SET ON** and **SET OFF** buttons to 'Paint in' or 'Wipe out' 'On' periods within the programme. The switch may be returned to the review mode by pressing the **REVU** button or to the normal operating mode by repeatedly pressing the **SET PROG** button to Su (Sunday). One further press returns the switch to the Normal Operating Mode.

Reviewing a Programme While Programming

During programming, it may be necessary to check the time setting of a change of state. This is achieved by pressing the **REVU** button and using the + or − buttons to move the analogue 'hand' to the period to be checked. The digital clock will change to show the time of each change of state as previously described. The time switch is returned to the Normal Operating Mode by repeatedly pressing the **REVU** button to Su (Sunday). One further press returns the switch to the Normal Operating Mode.



OVERRIDE

An override button, accessible with the switch window closed, provides an emergency facility to set the switch from an 'On' state to an 'Off' state or vice-versa.

NOTE:
It is necessary to select the correct channel before overriding the programme.

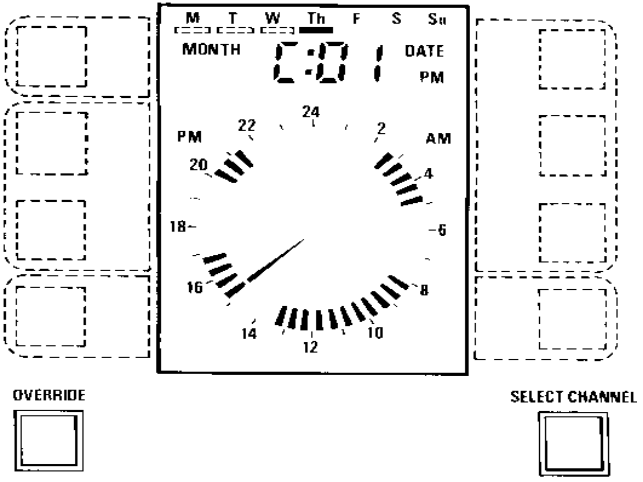
If the output channel is currently 'On' pressing the **OVERRIDE** button will immediately switch the channel 'Off'. The remainder of the programmed 'On' period will be temporarily deleted from the analogue programme display and the channel will remain 'Off' until the analogue 'hand' reaches the next 'On' period. At that point, the Override mode is cancelled, the channel will automatically return to the Normal Operating Mode, and the deleted part of the 'On' period will return to the analogue programme display.

If the output channel is currently 'Off', pressing the **OVERRIDE** button will immediately switch the channel 'On' for a preset period of two hours. The analogue programme display will show the override 'On' period by means of four programme 'On' markers. The channel will remain 'On' until the end of the two hour period and then return automatically to the Normal Operating Mode. The override programme markers will then be deleted from the display.

NOTE:
If the next programmed 'On' period for the selected channel is less than two hours from the current time, pressing the **OVERRIDE** button will immediately switch the channel from 'Off' to 'On'. The number of programmed 'On' markers required to ensure that the switch is 'On' until the next programmed 'On' period is reached are inserted in the programme display. Whenever the programmed 'On' period is reached the **OVERRIDE** condition is cancelled, the channel will automatically return to the Normal Operating Mode and the **OVERRIDE** markers are deleted from the display.

The overriden channel may be manually returned to the Normal Operating Mode at any time during the Override period by pressing the **OVERRIDE** button again.

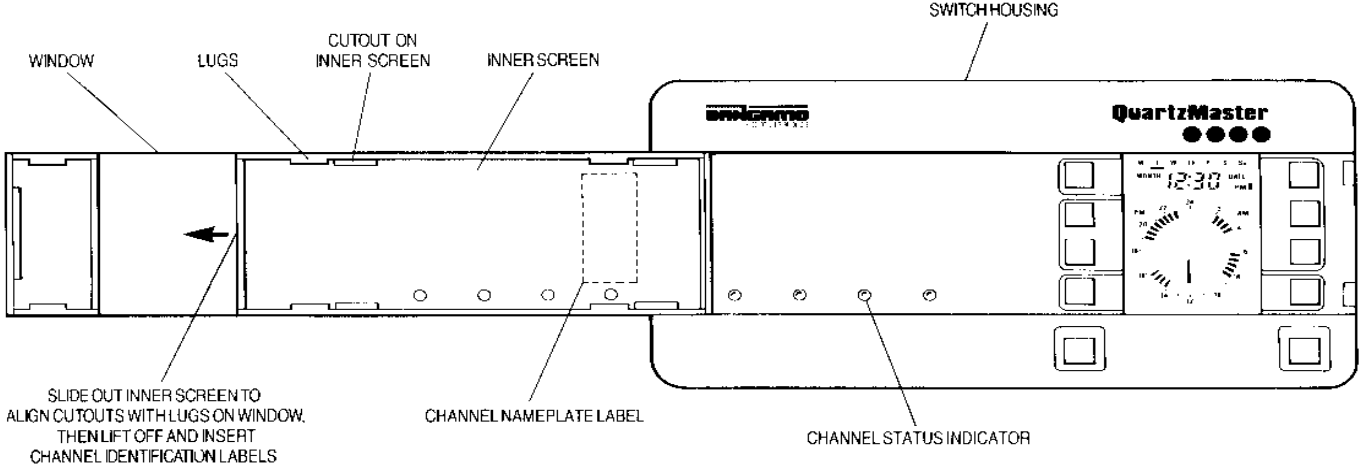
NOTE:
If the **SET CLOCK** or **SET PROG** buttons are operated for a channel in the **OVERRIDE** condition, the override for that channel will be cancelled when the time switch returns to the Normal Operating Mode.



CHANNEL STATUS

Normally, when a channel is in the 'On' Status, the red **LED** indicator below the channel nameplate is illuminated.

In certain terminal block wiring conditions, the indicator may show a changeover condition, and not necessarily On or Off. This should be made clear by the installer, and the condition marked clearly on the labels printed for each channel.



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SAMPLE PROGRAMME CHARTS

QuartzMaster

Channel No.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1.	On – 7.00 am Off – 12.15 pm On – 1.00 pm Off – 4.15 pm	Copy Monday	Copy Monday	Copy Monday	On – 7.00 am Off – 12.15 pm On – 1.00 pm Off – 3.30 pm	On – 7.30 am Off – 12 noon	Off – all day
2.	On – 5.00 am Off – 7.00 am On – 9.00 pm Off – 11.00 pm	Copy Monday	Copy Monday	Copy Monday	On – 5.00 am Off – 7.00 pm On – 9.00 pm	Off – 1.00 am On – 6.00 am Off – 7.00 am On – 11.00 am	Off – 3.00 am
3.	On – 9.00 am Off – 12 noon On – 1.30 pm Off – 7.00 pm	Copy Monday	Copy Monday	Copy Monday	On – 8.00 am Off – 12 noon On – 1.30 pm Off – 4.30 pm	On – 6.30 am Off – 12 noon	Off – all day
4.	On – 5.00 am Off – 7.00 am On – 9.00 am Off – 11.00 pm	Copy Monday	Copy Monday	Copy Monday	On – 7.00 am Off – 12.30 pm On – 11.00 pm	Off – 3.30 am On – 8.00 am Off – 12.30 pm On – 9.00 pm	Off – 1.00 am

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USER PROGRAMME CHARTS

QuartzMaster

Channel No.	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1.							
2.							
3.							
4.							

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