Model RM4-RTC
Real Time Clock
DIN Rail Mount Display/Controller
Operation and Instruction Manual

Table of Contents

1 Introduction

This manual contains information for the installation and operation of the RM4-RTC Monitor. This instrument may be used as a 12 or 24 hour clock or may be set to display day/month.

A total of four display mode options are available, these are:

- month.day

- day.month

- days

- hours.minutes

Selection display mode option is made at the **di SPrN9E** function, see section 5.25.

The time can be adjusted by using the **AdSt SECS** and **AdSt hour** functions or alternatively by using the **SEt rtc** function. Automatic adjustment for daylight saving periods is also provided for if required.

Clock synchronisation can be set to be from either the units internal clock generator, the 50Hz mains frequency, the 60Hz mains frequency, an optional high accuracy 10MHz crystal or optional GPS satellite receiver. The GPS satellite option requires that the optional RS232 or RS485 serial communications card is fitted and also requires a compatible GPS receiver.

Scaling and setup are accomplished by push button operation. "On screen" prompts are given for each function to assist in setting up the instrument. Some changes may require dismantling the instrument to alter PCB links. Up to 32 alarm settings can be used to control the alarm relay or relays, see details in this chapter for detailed instructions and also chapter 5.

Unless otherwise specified at the time of order, your instrument has been factory set to a standard configuration, see the function table for your selected mode for default settings. Full electrical isolation between power supply and optional serial output is provided, thereby eliminating grounding and common voltage problems. This isolation feature makes the RM4 ideal for interfacing to computers, PLCs and other data acquisition devices.

The RM4 series of Din Rail Monitor/Controllers are designed for high reliability in industrial applications.

1.1 Alarm relay operation

The RM4 is supplied with two standard alarm relays. Up to two extra relays can be optionally fitted to these instruments giving a total of four alarm relays. The alarm functions will not be seen and no alarm operation is possible unless the display is set to show hours.minutes. It is essential that the correct time, date and year is set for successful alarm operation since the RM4 uses the date and year settings to calculate the day of the week (Monday to Sunday). The alarm operation mode in this instrument allows up to 32 separate alarms to be made, **A 1** to **A32**. Each of these 32 alarm settings requires the choice of:

1. Choice of alarm number (**SEt AL**) - i.e. alarm **A 1** to **A32**.

2. Alarm switch on time (**A**x **On**) - i.e. the time at which the relay energises. Note: the "x" in **A**x **On** and all the other settings below will be replaced by the number **1** to **32** when displayed, depending on the alarm number selected.

3. Alarm duration (**A**x **dur**) - up to 23 hours 59 mins. Note; longer duration's are possible by using overlapping times and more than one alarm to operate a chosen relay.

4. Days of the week on which the alarm will operate (**dAY**).

5. Choice of relay which will operate for that alarm number (**A**x **rLY**).

When the operator enters the function or calibration mode and selects an alarm number at the **SEt AL** function the RM4 will automatically loop back to the **SEt AL** function at the end of the alarm setup sequence i.e. at the end of step 5 the display will return to step 1. This looping back allows the next alarm number choice to be made without having to pass through the other instrument functions. To exit this loop the user can either press the **P** button twice or, if the instrument has no **P** button, choose the option **End** at the **SEt AL** function and then press the **F** button. When the loop is exited the display will move on to the next function in the list outside the alarm setup loop i.e. **A**x**n.o** or **A**x**n.c**. The process of setting up the alarms (alarm 3 will be used for example purposes in this explanation) is as follows (see also the flow chart illustration which follows):

1. Enter the **FUNC** mode or **CAL** mode (see chapter 5 for method). The display should show **FUNC** followed by the first function **AdJSt SECS** (if enabled, see **rtC AdJSt**).

2. Press and release **F** until the display shows **SEt AL**. If the **F** button is pressed at this stage it will be assumed that no alarms are to be set and the display will move to the **A**x**n.o** or **A**x**n.c** function. To select an alarm number press **▲** and **▼** simultaneously, the display will show **A 1**, i.e. alarm number 1. Use the **▲** or **▼** button to select the alarm number required i.e. **A 1** to **A32**. If **End** is selected then it will be assumed that no new alarm settings are required. For this example **A3** will be chosen. Note: the alarm setting relates only to the alarm number and does not refer to the relay itself i.e. if **A3** is selected at this point it simply means that alarm number 3 is the one currently being setup and does not mean that relay 3 is being selected.

3. Press **F**. The display will show **A3 On**. Use the **▲** or **▼** button to select the time of day at which the relay (which will be chosen later) is to be activated. This on time will be in 24 hour time display format even if the main display is in 12 hour time display format.

4. Press **F**. The display will show **A3 dur**. Use the **▲** or **▼** button to select the required duration of the relay activation.

5. Press **F**. The display will show **dAY** followed by **MON** (Monday) and either **on** or **OFF**. Use the **▲** or **▼** button to select either **on** or **OFF** for Mondays, if **on** is selected this means that the current alarm (**A3**) will operate on Mondays, if **OFF** is selected then the alarm (**A3**) will not operate on Mondays. Press **F** to move on to the next day (**tUE**) and again select **on** or **OFF**. Continue the process up to and including Sunday.

6. Press **F**. The display will move on to the **A3rLY** function. Use the **▲** or **▼** button to select the required relay to be assigned to the current alarm (**A3**). To loop back to the **SEt AL** function press **F** or **P** or to exit the alarm loop press **P** twice or select **End** at the **SEt AL** function then press **F**.
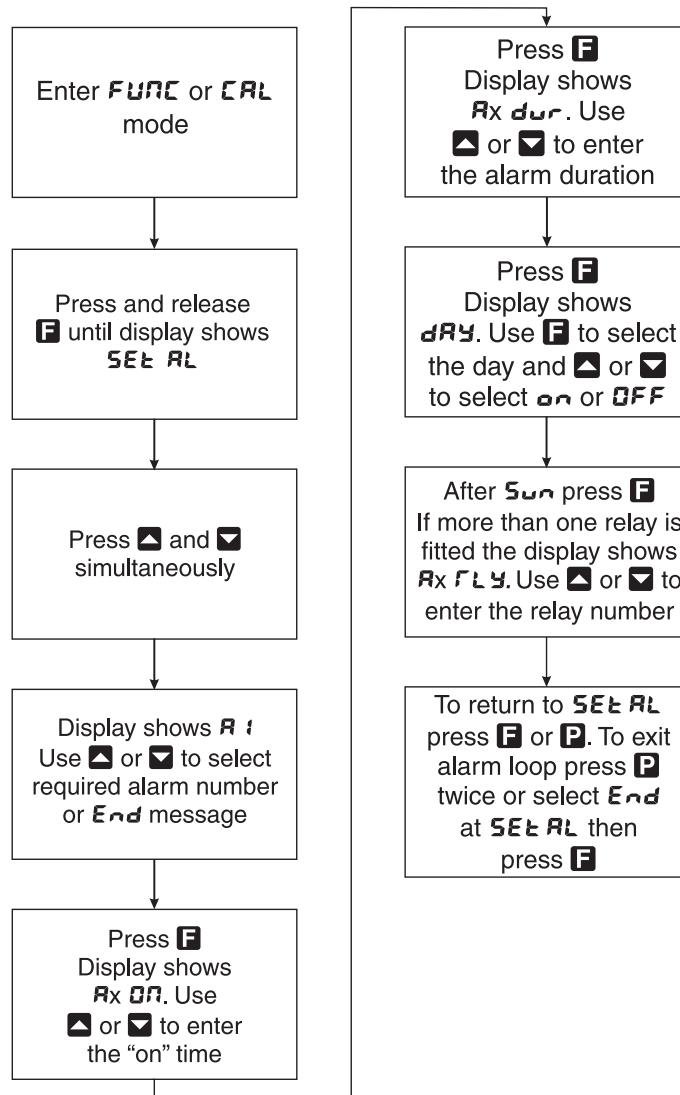
Example: Use alarm A1 to make relay 2 activate for 2 hour 15 minutes on every week day (not weekends) starting at 10.00 pm use the following settings.

SEt AL	**A 1**	
A1ON	**22.00**	
A1dur	**2.15**	
dAY	**MON**	**on**
	tUE	**on**
	uEd	**on**
	thu	**on**
	Fri	**on**
	SAt	**OFF**
	Sun	**OFF**
A1rLY	**2**	

The alarm settings will cause relay 2 to activate on every Monday to Friday at 10.00 pm (22.00) and reset 2 hours and 15 minutes later. For example the relay will activate at 10.00 pm on Monday and reset at 00.15 am the next day (Tuesday), 2 hours 15 minutes after activating.

Enter **FUNC** or **CAL** mode

↓

Press and release **F** until display shows **SEt AL**

↓

Press **▲** and **▼** simultaneously

↓

Display shows **A 1** Use **▲** or **▼** to select required alarm number or **End** message

↓

Press **F** Display shows **Ax ON**. Use **▲** or **▼** to enter the "on" time

→

Press **F** Display shows **Ax dur**. Use **▲** or **▼** to enter the alarm duration

↓

Press **F** Display shows **dAY**. Use **F** to select the day and **▲** or **▼** to select **on** or **OFF**

↓

After **Sun** press **F** If more than one relay is fitted the display shows **Ax rLY**. Use **▲** or **▼** to enter the relay number

↓

To return to **SEt AL** press **F** or **P**. To exit alarm loop press **P** twice or select **End** at **SEt AL** then press **F**

## 1.2 Allocating more than one alarm number to a relay

A relay can be allocated to any number of the 32 available settings but only one relay per alarm can be allocated e.g. if **A 1** is allocated to relay 1 then **A 1** cannot be allocated to any other relay. For example if alarm numbers **A 1**, **A2**, **A8** and **A 10** all have relay 2 selected at the **Ax rLY** function then each of these alarm settings will control relay 2 operation. Each of the alarms need to be individually set up by passing through the alarm loop and making the required settings for each alarm number.

1.3 Overlapping alarms

A relay can be allocated to more than one alarm number with overlapping times if required. A typical application for an overlapping alarm is in cases where an alarm longer than 24 hours is required. For example alarm number **A 1** could be set to operate for 20 hours starting at a given time and alarm number **A2** could be set to operate for a further 20 hours. If the **A2** program on time occurs just before the **A 1** duration ends then the relay will not de-energise until the 40 hours from the initial **A 1ON** time is up.

2 Mechanical installation

The RM4 is designed for DIN rail, horizontal mounting. The instrument clips on to 35mm DIN standard rails (EN50022). Cut the DIN rail to length and install where required. To install the RM4 simply clip onto the rail as shown below. To remove the RM4 lever the lower arm downwards using a broad bladed screwdriver to pull the clip away from the DIN rail.
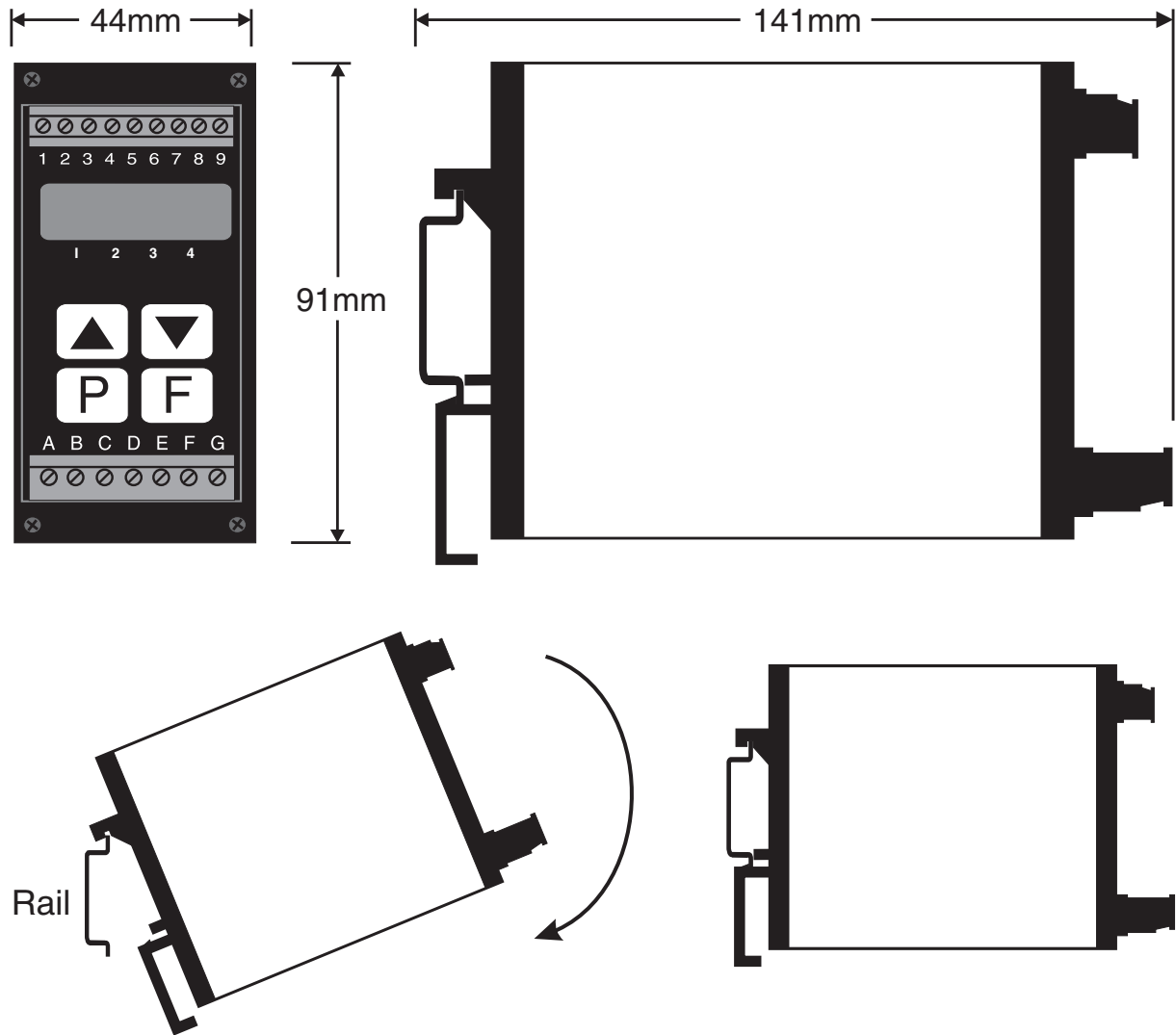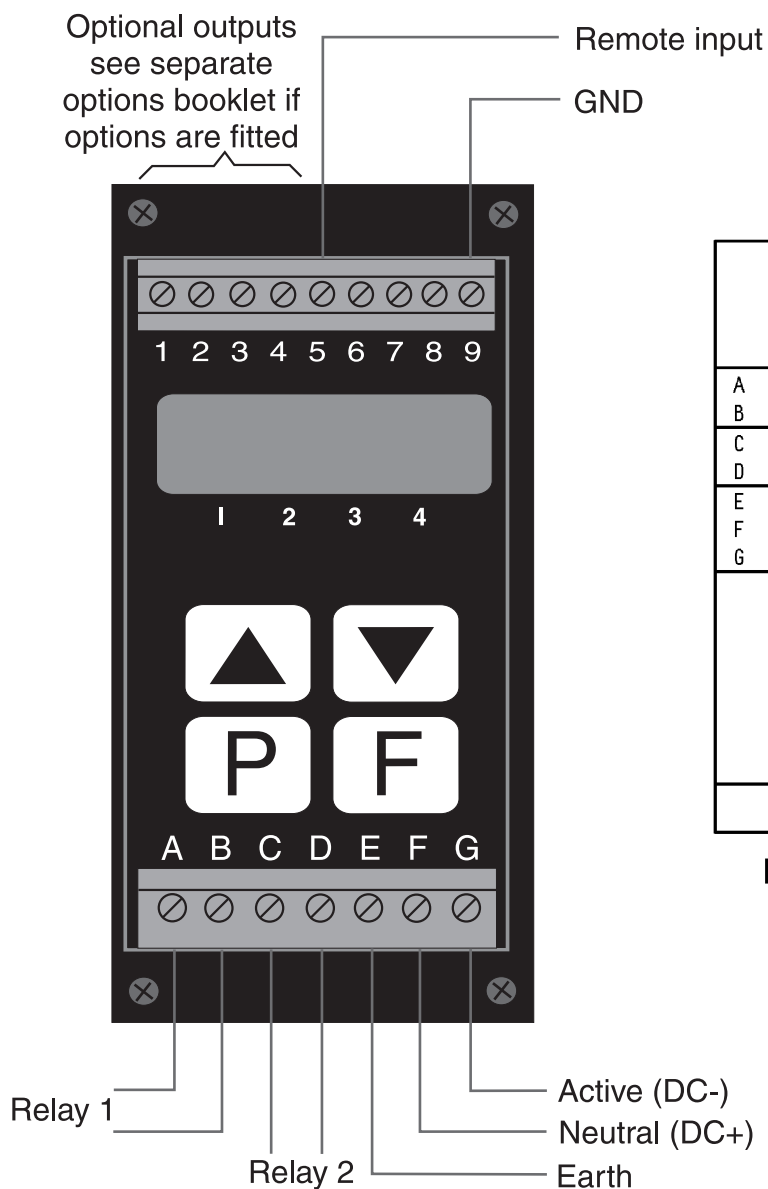
3 Electrical installation

The RM4 Meter is designed for continuous operation and no power switch is fitted to the unit. It is recommended that an external switch and fuse be provided to allow the unit to be removed for servicing. The terminal blocks allow for wires of up to 2.5mm^2 to be fitted for power supply and relays 1 and 2 or 1.5mm^2 for input connections and optional outputs. Connect the wires to the appropriate terminals as indicated below.

Refer to connection diagrams provided in this manual to confirm proper selection of voltage, polarity and input type before applying power to the instrument. When power is applied the instrument will cycle through a display sequence, indicating the software version and other status information, this indicates that the instrument is functioning. Acknowledgement of correct operation may be obtained by applying an appropriate input to the instrument and observing the resultant reading.

Note that the power supply type is factory configured.

Instrument data label - (example)

A	RELAY 1	COM	1	
B	RELAY 1	N/O	2	
C	RELAY 2	COM	3	
D	RELAY 2	N/O	4	
E	MAINS EARTH		5	REMOTE INPUT
F	240 VAC NEUTRAL		6	
G	240 VAC ACTIVE		7	
			8	
			9	GND

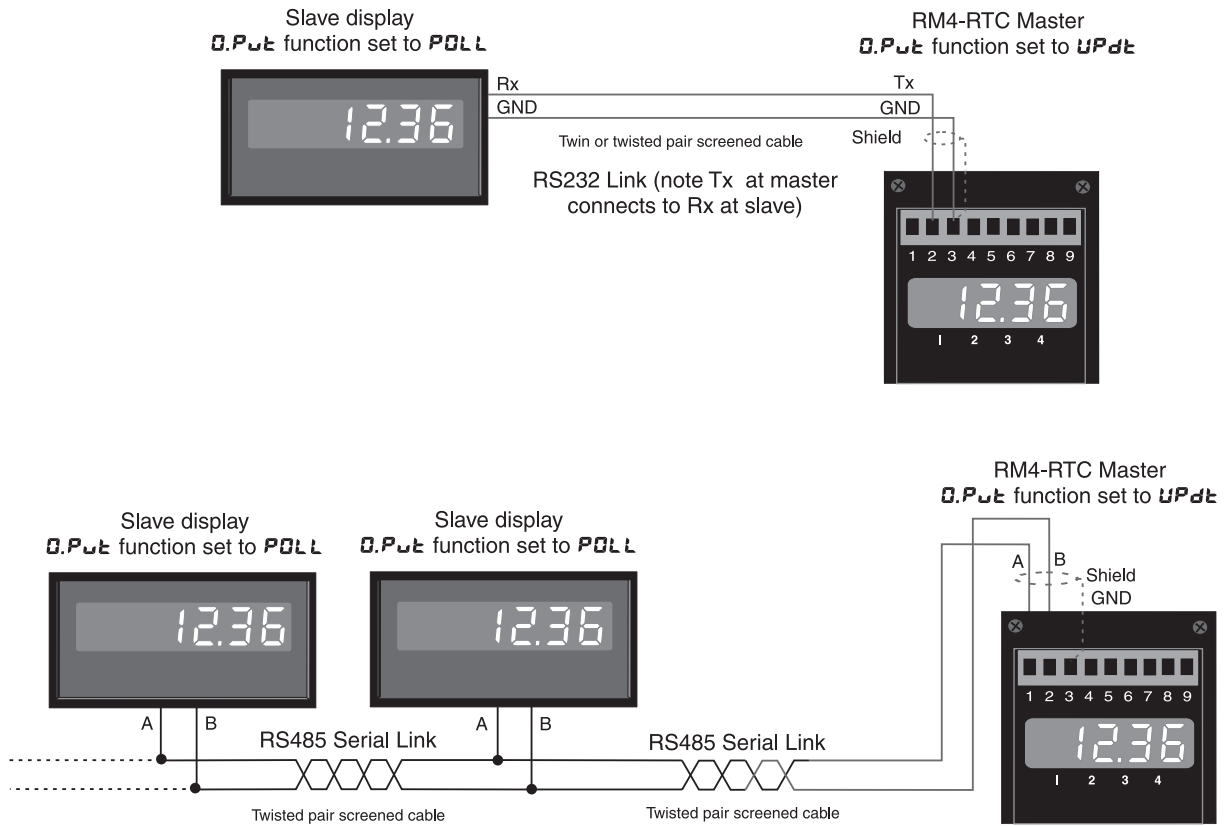| RM4-RTC-240-5E	SERIAL No.: XXXXX-XXX

3.1 Optional outputs

Refer to the separate "RM4 Din Rail Meter Optional Output Addendum" for connection details of optional outputs fitted.
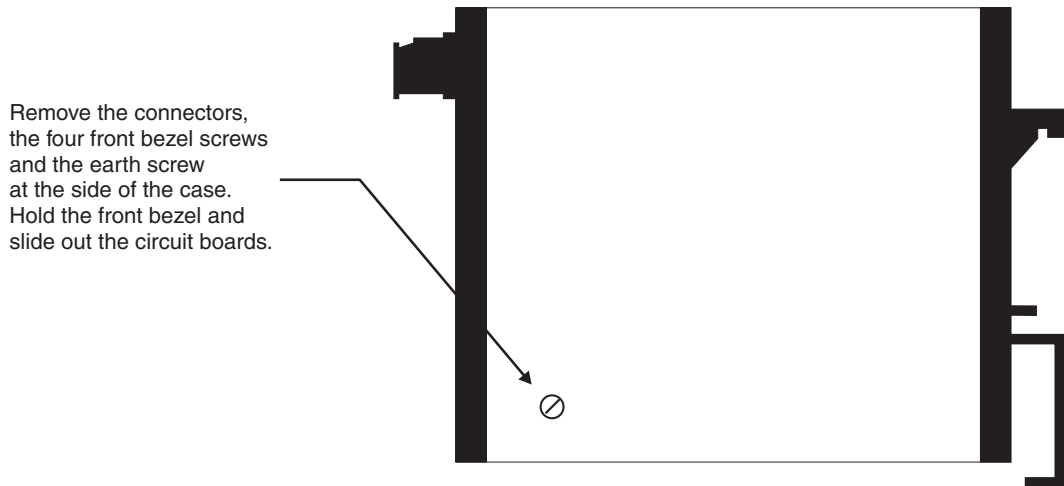
3.2 Master slave wiring example

Note that this connection type requires the optional RS232 or RS485 serial communications.
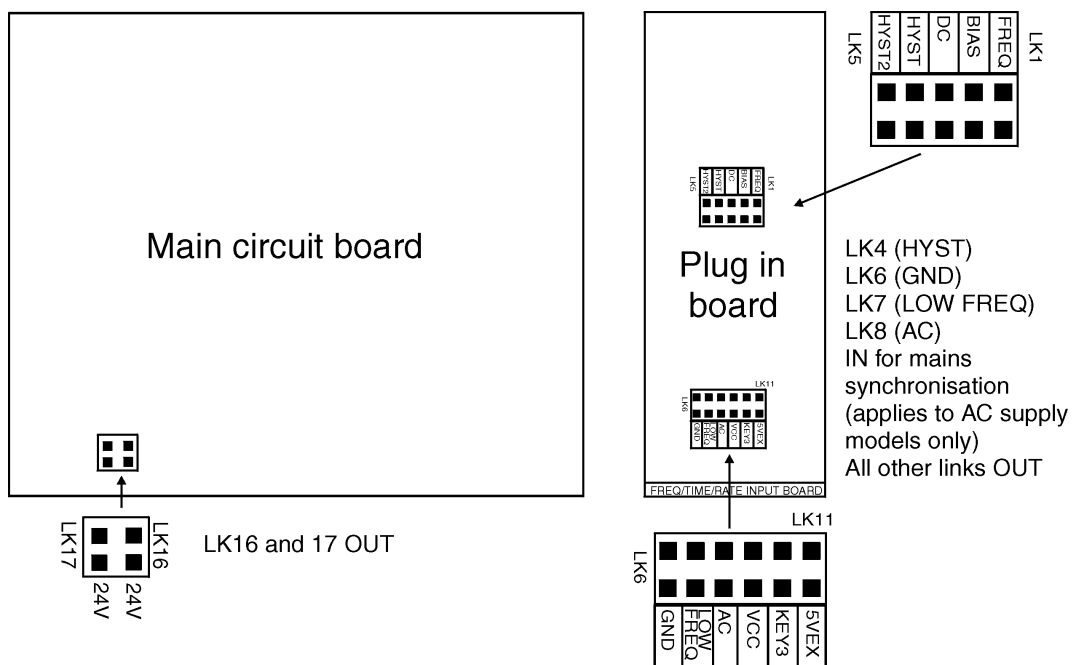
3.3 Configuring the input board

Remove the circuit board from the case following the instructions below. Link settings for the main input board are as shown below. For optional output link settings consult the separate "RM4 DIN Rail Meter Optional Output Addendum" booklet.

Remove the connectors, the four front bezel screws and the earth screw at the side of the case. Hold the front bezel and slide out the circuit boards.

3.4 Circuit board links for mains synchronisation

Note that the RM4 references the frequency of the incoming AC supply from the power supply transformer. No other input is required for mains synchronisation.

Main circuit board

LK16 and 17 OUT

LK17 LK16
24V   24V

Plug in board

LK4 (HYST)
LK6 (GND)
LK7 (LOW FREQ)
LK8 (AC)
IN for mains synchronisation
(applies to AC supply models only)
All other links OUT

LK5   LK1
HYST2 HYST DC BIAS FREQ

FREQ/TIME/RATE INPUT BOARD

LK11
LK6
GND LOW FREQ AC VCC KEY3 5VEX

4 Function tables - summary of setup functions

Note: the order in which the functions appear on the display may not be exactly as shown below. The availability and order of functions is determined by choice of function settings and options fitted.

Display	Function	Range	Default	Your record	Ref/Page
AJSt SECS	Adjust seconds	**-99.9** to **99.9**	n/a		5.1 / 15
AJSt hour	Adjust hour	**-9** to **9**	n/a		5.2 / 15
SEt AL	Set alarm number	**A1** to **A32** or **End**	**A1**	See 4.1	5.3 / 15
Ax	Alarm on time e.g. **A1** followed by **On** if **F** is pressed	**0.00** to **23.59**	**0.00**	See 4.1	5.4 / 16
Ax **dur**	Alarm duration	**0.00** to **23.59**	**0.00**	See 4.1	5.5 / 16
dAY	Day setting	**MON on** or **MON OFF** to **Sun on** or **Sun OFF**	All **OFF**	See 4.1	5.6 / 16
Ax **rLY**	Allocate alarm to relay	**1** to number of relays fitted	**1**	See 4.1	5.7 / 17
Ax**n.o** or **A**x**n.c**	Alarm relay x action to normally open (de-energised) or normally closed (energised)	**A**x**n.o** or **A**x**n.c**	**A**x**n.o**	See 4.1	5.8 / 17
br9t	Display brightness level	**1** to **15**	**15**		5.9 / 17
duLL	Display remote brightness switching	**0** to **15**	**1**		5.10 / 18
d.oFF SECS	Auto display dimming timer	**0** to **9999**	**0**		5.11 / 18
r.i NP	Remote input function	**NONE**, **SP.Ac**, **No.Ac** or **duLL** also included but not applicable are: **P.HLd**, **d.HLd**, **Hi** , **Lo** and **Hi Lo**	**NONE**		5.12 / 18
ACCS	Access mode	**OFF**.**EASY**. **NONE** or **ALL**	**OFF**		5.13 / 19

(***Optional**)—this function will only be accessible if the relevant option is fitted

rtc	Clock display mode	12hr or 24hr	24hr		5.14 / 19
rtc SYNC	Clock synchronisation method	NONE, 50H, 60H, CrYS or GPS	NONE		5.15 / 19
Utc OFSt	Universal time offset for GPS synchronisation	-720 or 720	0		5.16 / 20
dSt AJSt	Daylight saving time automatic adjustment	on or OFF	on		5.17 / 20
dSt ON	Daylight saving Sunday start	LASt, 1St, 2nd, 3rd, or 4th	LASt		5.18 / 20
dSt ON	Daylight saving month start	JAN to dEC	Oct		5.19 / 21
dSt OFF	Daylight saving Sunday finish	LASt, 1St, 2nd, 3rd, or 4th	LASt		5.20 / 21
dSt OFF	Daylight saving month end	JAN to dEC	mAr		5.21 / 21
SEt rtc	Set clock	Time setting	n/a		5.22 / 21
SEt dAtE	Set date	Date setting	n/a		5.23 / 21
SEt YEAr	Set year	Year setting	n/a		5.24 / 22
diSP rNGE	Display range	mm.dd, dd.mm, ddd or HH.mm	HH.mm		5.25 / 22
rtc AJSt	Adjustment access	on or OFF	on		5.26 / 22
bAUd rAtE	Baud rate for serial communications (*Optional)	300, 600, 1200, 2400, 4800, 9600, 19.2 or 38.4	9600		5.27 / 22
Prty	Parity for serial communications (*Optional)	NONE, EUEN or odd	NONE		5.28 / 23
O.Put	Output for serial communications (*Optional)	diSP, Cont, POLL or UPdt	Cont		5.29 / 23
Addr	Instrument address for serial communications (*Optional)	0 to 31	0		5.30 / 23

(*Optional)—this function will only be accessible if the relevant option is fitted

4.1 Relay tables

Record your relay mode settings in the table below

Display	Relay 1	Relay 2	Relay 3	Relay 4
Axn.o or *Axn.c*				

Alarm settings - record your settings here

Alarm	*AxON*	*Axdur*	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Relay
A1										
A2										
A3										
A4										
A5										
A6										
A7										
A8										
A9										
A10										
A11										
A12										
A13										
A14										
A15										
A16										
A17										
A18										
A19										
A20										
A21										
A22										
A23										
A24										
A25										
A26										
A27										
A28										
A29										
A30										
A31										
A32										

5 Explanation of functions

The RM4 setup and calibration functions are configured through a push button sequence. The three push buttons located at the rear of the instrument (also at the front on some display options) are used to alter settings. Two basic access modes are available:

FUNC mode (simple push button sequence) allows access to commonly set up functions such as alarm setpoints.

CAL mode (power up sequence plus push button sequence) allows access to all functions including calibration parameters.

Once **CAL** or **FUNC** mode has been entered you can step through the functions, by pressing and releasing the **F** push button, until the required function is reached. Changes to functions are made by pressing the or push button (in some cases both simultaneously) when the required function is reached. See the flow chart example on the following page.

Entering **CAL** Mode

1. Remove power from the instrument. Hold in the **F** button and reapply power. The display will indicate **CAL** as part of the "wake up messages" when the **CAL** message is seen you can release the button.

2. When the "wake up" messages have finished and the display has settled down to its normal reading press, then release the **F** button.
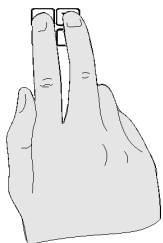
3. Within 2 seconds of releasing the **F** button press, then release the ▲ and ▼ buttons together. The display will now indicate **FUNC** followed by the first function.

Note: If step 1 above has been completed then the instrument will remain in this **CAL** mode state until power is removed. i.e. there is no need to repeat step 1 when accessing function unless power has been removed.

Entering **FUNC** Mode

No special power up procedure is required to enter **FUNC** mode.

1. When the "wake up" messages have finished and the display has settled down to its normal reading press, then release the **F** button.

2. Within 2 seconds of releasing the **F** button press, then release the ▲ and ▼ buttons together. The display will now indicate **FUNC** followed by the first function.

Alternative **CAL** Mode Entry

This alternative method allows **CAL** mode entry without the need to remove power:
1. Enter **FUNC** mode using the 2 steps above
2. When the first function appears press and hold the **P** button until you see the message **FUNC** followed by **CAL** (the **P** button will have to be held pressed for approximately 2 seconds)
3. You should now return to the function you were in but have full access to **CAL** mode functions
Note: when you exit back to live reading the RM4 will remain in **CAL** mode for approximately 4 minutes, after this time you will need to repeat this process to enter **CAL** mode.

Explanation of Functions

5.1 Adjust seconds

Display:	**AdSt SECS**
Range:	**-99.9** to **99.9**
Default Value:	n/a

This function allows simple adjustment of the time in seconds.tenths of the time. e.g. if the clock is known to be 5 seconds fast then at the **AdSt SECS** function use the ▼ button to select **-5.0**, then press the **F** button to accept the change. When the display returns to its normal mode 5 seconds will have been subtracted from the time. See also **rtc AdSt** function.

Note: the seconds display is only available for viewing if the instrument is powered up with the **F** button held pressed until the **CAL** message is seen, once powered up in this mode the ▲ or ▼ buttons can be used to toggle to the mm.ss display

5.2 Adjust hour

Display:	**AdSt hour**
Range:	**-9** to **9**
Default Value:	n/a

This function allows simple adjustment of the time in hours. e.g. if the clock is known to be 1 hour slow then at the **AdSt hour** function use the ▲ button to select **1**, then press the **F** button to accept the change. When the display returns to its normal mode 1 hour will have been added to the time. See also **rtc AdSt** function.

5.3 Set alarm number

Display:	**SEt AL**
Range:	**A1** to **A32** or **End**
Default Value:	**A1**

Refer to examples and further description in sections 1.1, 1.2 and 1.3.

The set alarm function allows the user to select the alarm number for which the alarm settings which follow will apply. To view and select an alarm number the ▲ and ▼ buttons must first be pressed simultaneously, the ▲ or ▼ button may then be used to select an alarm number. The choices available are **A1** to **A32** i.e. alarm number 1 to alarm number 32. The alarm numbers refer to the alarm only and not to a relay number. e.g. if **A3** is chosen then the on time, duration, day etc. alarm functions which follow will be for alarm setting 3. This function also allows the option to select **End**. The **End** option allows exit from the alarm setup loop.

Note: the alarm functions will only be seen if the function is set to hours, minutes etc. It will not be seen if the function is set to display days, months etc. Some of the alarm operation functions below are marked "x" in place of the relay number. The "x" indicates the relay number, the display will show the actual relay number e.g. **A 1n.o** etc.

5.4   Alarm on time

Display: Ax
Range: **0.00** to **23.59**
Default Value: **0.00**

Refer to examples and further description in sections 1.1, 1.2 and 1.3.
Displays and sets the time at which the chosen alarm will cause the relay will activate. When the alarm on time is reached the relay will activate and will remain activated for the length of time set at the Ax **dur** function if the alarm is set to operate on that day.

5.5   Alarm duration

Display: Ax **dur**
Range: **0.00** to **23.59**
Default Value: **0.00**

Refer to examples and further description in sections 1.1, 1.2 and 1.3.
The alarm duration is the period of time for which the relay will remain energised once activated. The alarm duration can be set in hours and minutes . At the end of the alarm duration the relay will become de-energised unless this relay has an overlapping alarm setting i.e. more than one alarm setting is being used to control the relay.

5.6   Day setting

Display: **dAY**
Range: **MON on** or **MON OFF** to **Sun on** or **Sun OFF**
Default Value: All **OFF**

Refer to examples and further description in sections 1.1, 1.2 and 1.3.
The day setting allows each day of the week to be selected as on or off. This means that a given alarm setting can be programmed to operate at any given day or days of the week. The options are:

Monday	**MON**	**on** or **OFF**
Tuesday	**tuE**	**on** or **OFF**
Wednesday	**WEd**	**on** or **OFF**
Thursday	**thu**	**on** or **OFF**
Friday	**Fri**	**on** or **OFF**
Saturday	**SAt**	**on** or **OFF**
Sunday	**Sun**	**on** or **OFF**

5.7   Allocate alarm to relay

Display: Ax ᴦᴸᎩ

Range: *1* to number of relays fitted

Default Value: *1*

Refer to examples and further description in sections 1.1, 1.2 and 1.3.

The functions allows a choice of relay to be used for the alarm number currently selected. Choices are 1, 2 etc. up to the number of relays fitted. For example if alarm number **A3** has been selected via the **SEᴸ AᴸL** function then choosing **2** at the **A3ᴦᴸᎩ** function will mean that relay 2 will operate at the on time selected by the **A3Oᴨ** function and will remain on for the duration selected via the **A3dᴜᴦ** function. Relays can be made to operate from any or all of the 32 alarm settings but only one relay per alarm can be allocated e.g. if **A1** is allocated to relay 1 then **A1** cannot be allocated to any other relay.

5.8   Alarm relay normally open/closed

Display: Axᴨ.ᴏ or Axᴨ.ᴄ

Range: Axᴨ.ᴏ or Axᴨ.ᴄ

Default Value: Axᴨ.ᴏ

Displays and sets the setpoint alarm relay x action to normally open (de-energised) or normally closed (energised), when no alarm condition is present. Since the relay will always open when power is removed a normally closed alarm is often used to provide a power failure alarm indication. To set the alarm alarm for normally open or closed go to the **Axᴨ.ᴏ** or **Axᴨ.ᴄ** function and use the ▲ or ▼ push buttons to set the required operation then press **F** to accept this selection.

Example:

If set to **A1ᴨ.ᴏ** alarm relay 1 will be open circuit when the display is outside alarm condition and will be closed (short circuit across terminals) when the display is in alarm condition.

5.9   Display brightness

Display: ᴮᴦ᎐ᴸ

Range: *1* to *15*

Default Value: *15*

Displays and sets the digital display brightness. The display brightness is selectable from *1* to *15*, where *1* = lowest intensity and *15* = highest intensity. This function is useful for improving the display readability in dark areas or to reduce the power consumption of the instrument. See also the **dᴜᴸL** function 5.10. To set brightness level go to the **ᴮᴦ᎐ᴸ** function and use the ▲ or ▼ push buttons to set the value required then press **F** to accept this value.

5.10 Display remote brightness switching

Display:	**duLL**
Range:	**0** to **15**
Default Value:	**1**

Displays and sets the level for remote input brightness switching, see **r.I NP** function. When a remote input is set to **duLL** the remote input can be used to switch between the display brightness level set by the **br9t** function 5.9 and the display brightness set by the **duLL** function. The display dull level is selectable from **0** to **15**, where **0** = lowest intensity and **15** = highest intensity. This function is useful in reducing glare when the display needs to be viewed in both light and dark ambient light levels. To set dull level go to the **duLL** function and use the ▲ or ▼ push buttons to set the value required then press 🇫 to accept this value. The **d.oFF SECS** function (automatic display blanking or dulling) will also cause the **duLL** function to appear if the **d.oFF SECS** function is enabled i.e. set to any value other than **0**.

Example:
With **duLL** set to **4** and **br9t** set to **15** and the **r.I NP** function set to **duLL** the display brightness will change from the **15** level to **4** when a switch connected to the remote input terminals is activated.

5.11 Auto display dimming timer

Display:	**d.oFF SECS**
Range:	**0** to **9999**
Default Value:	**0**

This function allows a time to be set after which the display brightness (set by the **br9t** function) will automatically be set to the level set at the **duLL** function. The auto dimming feature can be used to reduce power consumption. The function can be set to any value between **0** and **9999** seconds. A setting of **0** disables the auto dimming. The display brightness can be restored by pressing any of the instruments front push buttons. The display brightness will also be restored whilst one or more alarm relays is activated.

5.12 Remote input function

Display:	**r.I NP**
Range:	**NONE**, **SP.Ac**, **No.Ac** or **duLL** also included but not applicable are: **P.HLd**, **d.HLd**, **HI** , **Lo** and **HI Lo**
Default Value:	**NONE**

The function selects the function of the remote input terminals. The remote input is activated by shorting a switch connected between the EXTERNAL INPUT and GROUND terminals. The **P.HLd**, **d.HLd**, **HI** , **Lo** and **HI Lo** options seen are not applicable to this software version, the useable options available are:

NONE	No remote input function required
SP.Ac	Setpoint access only. This blocks access to any functions except the

	alarm setpoint functions unless the remote input pins are short circuited or entry is made via **CAL** mode.
No.Ac	No access. This blocks access to all functions unless the remote input pins are short circuited or entry is made via **CAL** mode.
duLL	Display brightness control. The remote input can be used to change the display brightness. When this mode is selected the display brightness can be switched, via the remote input, between the brightness level set at the **brgt** function and the brightness level set at the **duLL** function.

5.13 Access mode

Display:	**ACCS**
Range:	**OFF**, **EASY**, **NONE** or **ALL**
Default Value:	**OFF**

Access mode - the access mode function **ACCS** has four possible settings namely **OFF**, **EASY**, **NONE** and **ALL**. If set to **OFF** the mode function has no effect on alarm relay operation. The **EASY** setting is not used in this software version. If set to **NONE** there will be no access to any functions via **FUNC** mode, entry via **CAL** mode must be made to gain access to alarm and calibration functions. If set to **ALL** then access to all functions, including calibration functions, can be gained via **FUNC** mode.

5.14 Clock display mode

Display:	**rtc**
Range:	**12hr** or **24hr**
Default Value:	**24hr**

The real time clock may be set to 12 hour display mode, indicated by **12hr** on the display or 24 hour display mode, indicated by **24hr** on the display. Use the ▲ or ▼ button to alter the mode if required. This setting is only applicable to hours.mins or hours.min.secs displays modes.

5.15 Clock synchronisation method

Display:	**rtc SYNC**
Range:	**NONE**, **50H**, **60H**, **CrYS** or **gPS**
Default Value:	**NONE**

Displays and sets the clock synchronisation to be used.

- **NONE** for internal clock chip use.

- **50H** to synchronise the clock to 50Hz mains frequency.

- **60H** to synchronise the clock to 60Hz mains frequency.

- **CrYS** to synchronise to the optional 10MHz high accuracy clock crystal if this option is fitted.

- **GPS** for GPS synchronisation (requires serial communications option plus GPS receiver).

An AC power supply type display is required for mains frequency synchronisation since the frequency is measured directly from the incoming supply see section 3.4 for link setting requirements for mains synchronisation.

5.16 Universal time offset for GPS synchronisation

Display: **Utc OFSt**

Range: **-720** or **720**

Default Value: **0**

Sets the offset in minutes from universal time. When using optional GPS synchronisation the signal transmitted uses a "universal time". The offset function allows the local offset from this "universal" time to be input in minutes. For example if local time is 10 hours (600 mins.) ahead of GPS universal time then set **Utc OFSt** to **600**.

5.17 Daylight saving time automatic adjustment

Display: **dSt AJSt**

Range: **on** or **OFF**

Default Value: **on**

If automatic daylight saving time adjustment is not required set this function to **OFF**. If automatic daylight saving time adjustment is required set this function to **on**. If set to **on** then the four **dSt** functions below will appear and will need to be set.

5.18 Daylight saving Sunday start

Display: **dSt On**

Range: **LASt**, **1St**, **2nd**, **3rd**, or **4th**

Default Value: **LASt**

Select first, second, third fourth or last Sunday in the month to start daylight saving time adjustment. The hour will change at 0200 on the Sunday morning selected. This function will only be seen if **dSt AJSt** is set to **on**.

5.19   Daylight saving month start

Display: **dSt On**
Range: **JAN** to **dEC**
Default Value: **Oct**

Allows selection of the month to start daylight saving time adjustment. This function will only be seen if **dSt AdSt** is set to **on**.

5.20   Daylight saving Sunday finish

Display: **dSt OFF**
Range: **LASt**, **1St**, **2nd**, **3rd**, or **4th**
Default Value: **LASt**

Select first, second, third fourth or last Sunday in the month to end daylight saving time adjustment. The hour will change at 0200 on the Sunday morning selected. This function will only be seen if **dSt AdSt** is set to **on**.

5.21   Daylight saving month end

Display: **dSt OFF**
Range: **JAN** to **dEC**
Default Value: **ñAr**

Allows selection of the month to end daylight saving time adjustment. This function will only be seen if **dSt AdSt** is set to **on**.

5.22   Set clock

Display: **SEt rtc**
Range: Time setting
Default Value: n/a

Sets the current time for real time clock mode of operation. To alter the current time setting press, then release the ▲ and ▼ buttons simultaneously when the **SEt rtc** function is displayed. The display will show the time setting. Use the ▲ or ▼ button to alter the time as required.

5.23   Set date

Display: **SEt dAtE**
Range: Date setting
Default Value: n/a

Sets the current date for real time clock mode of operation in mm.dd format. Use the ▲ or ▼

button to alter the date as required. The days will alter first followed by the month.

5.24   Set year

Display: **SEt YEAr**

Range: Year setting

Default Value: n/a

Sets the current year for real time clock mode of operation. Use the ▲ or ▼ button to alter the year as required.

5.25   Display range

Display: **di SP rngE**

Range: **ññ.dd**, **dd.ññ**, **ddd** or **HH.ññ**

Default Value: **HH.ññ**

The display range function allows selection of various display modes.   The following options are available:

ññ.dd	to display month.day
dd.ññ	to display day.month
ddd	to display days
HH.ññ	to display in hours.minutes

5.26   Adjustment access

Display: **rtc AdSt**

Range: **on** or **OFF**

Default Value: **on**

The functions **AdSt SECS** and **AdSt hour** are placed at the beginning of the function table to give easy access for basic adjustment. The **rtc AdSt** function allows the choice of **on** or **OFF**. When set to **on** the operator may gain access to the first two functions simply by entering via **FUnC** mode. When set to **OFF** the operator must enter via **CAL** mode to gain access to these functions.

5.27   Baud rate for optional serial communications

Display: **bAud rAtE**

Range: **300**,**600**, **1200**,**2400**,**4800**,**9600**, **19.2** or **38.4**

Default Value: **9600**

Set baud rate - seen only with serial output option. Refer to the separate "RM4 Din Rail Meter Optional Output Addendum" booklet supplied when optional outputs are fitted. Select from **300**,

600, **1200**, **2400**, **4800**, **9600**, **19.2** or **38.4** baud.

5.28 Parity for optional serial communications

Display: **PrtY**
Range: **NONE**, **EUEN** or **odd**
Default Value: **NONE**

Set parity - seen only with serial output option. Refer to the separate "RM4 Din Rail Meter Optional Output Addendum" booklet supplied when optional outputs are fitted. Select parity check to either **NONE**, **EUEN** or **odd**.

5.29 Output mode for optional serial communications

Display: **O.Put**
Range: **diSP**, **Cont**, **POLL** or **UPdt**
Default Value: **Cont**

Set serial interface mode - seen only with serial output option. Allows user to select the serial interface operation as follows:

diSP - sends image data from the display without conversion to ASCII.
Cont - sends time in ASCII form at a continuous rate
POLL - controlled by computer or PLC as host. Host sends command via RS232/485 and instrument responds as requested.
UPdt - This mode is used when the display is used as a master clock in a master/slave clock system. The master clock will automatically update any other slave clocks attached to it via serial communications. All slave displays must be set to operate in **POLL** mode.

5.30 Instrument address for optional serial communications

Display: **Addr**
Range: **0** to **31**
Default Value: **0**

Set unit address for polled (**POLL**) mode (**0** to **31**)) - seen only with serial output option. Refer to the separate "RM4 Din Rail Meter Optional Output Addendum" booklet supplied when optional outputs are fitted. Allows several units to operate on the same RS485 interface reporting on different areas etc. The host computer or PLC may poll each unit in turn supplying the appropriate address. The unit address ranges from 0 to 31 (DEC) but is offset by 32 (DEC) to avoid clashing with ASCII special function characters (such as <STX> and <CR>). Therefore 32 (DEC) or 20 (HEX) is address 0, 42 (DEC) or 2A (HEX) is address 10.

5.31 Returning to normal measure mode

When the calibration has been completed it is advisable to return the instrument to the normal mode (where calibration functions are less likely to be tampered with). To return to normal mode, turn off power to the instrument, wait a few seconds and then restore power.

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6 Specifications

6.1 Technical specifications

Function:	Real time clock
Accuracy:	Internal oscillator typically ± 30 sec/month.
	Mains sync.: Accurate to mains frequency.
	Where mains frequency is controlled typical accuracy is ± 1 second.
	High accuracy crystal ± 3 sec/month.
	GPS sync.: Accurate to GPS system ± 0.1 second.
Synchronisation:	Internal clock oscillator or mains frequency (50 or 60Hz) or
	Optional high accuracy 10MHz crystal or optional GPS input
Microprocessor:	MC68HC11F CMOS
Ambient temperature:	-10 to 60° C
Humidity:	5 to 95% non condensing
Display:	LED 5 digit 7.6mm + alarm annunciator LEDs
Power supply:	AC 240V, 110V 32V or 24V 50/60Hz
	or DC isolated wide range 12 to 48V.
	Note: supply type is factory configured.
Power consumption:	AC supply 4 VA max, DC supply typically 150mA at 12VDC and
	75mA at 24VDC with no optional outputs
Output (standard):	2 x relay, Form A, rated 5A resistive. Programmable N.O. or N.C

6.2 Optional outputs

Third relay:	Rated 0.5A resistive 30VAC or DC
	May be configured as form A or form C if the third relay
	is the only option fitted
Fourth relay:	Rated 0.5A resistive 30VAC or DC, form A
Serial communications:	Isolated RS232, RS485 or RS422 (ASCII)

Some combinations of optional outputs are available e.g. analog output plus extra relay.
Consult supplier for available combinations.

6.3 Physical characteristics

Case size:	44mm(w) x 91mm(h) x 141mm(d)
Connections:	Plug in screw terminals (max. 2.5mm^2 wire for
	power and relays, max. 1.5mm^2 wire for remote input and options)
Weight:	470 gms basic model, 500 gms with option card

7 Guarantee and service

The product supplied with this manual is guaranteed against faulty workmanship for a period of two years from the date of dispatch.

Our obligation assumed under this guarantee is limited to the replacement of parts which, by our examination, are proved to be defective and have not been misused, carelessly handled, defaced or damaged due to incorrect installation. This guarantee is VOID where the unit has been opened, tampered with or if repairs have been made or attempted by anyone except an authorised representative of the manufacturing company.

Products for attention under guarantee (unless otherwise agreed) must be returned to the manufacturer freight paid and, if accepted for free repair, will be returned to the customers address in Australia free of charge.

When returning the product for service or repair a full description of the fault and the mode of operation used when the product failed must be given. In any event the manufacturer has no other obligation or liability beyond replacement or repair of this product.

Modifications may be made to any existing or future models of the unit as it may deem necessary without incurring any obligation to incorporate such modifications in units previously sold or to which this guarantee may relate.

This document is the property of the instrument manufacturer and may not be reproduced in whole or part without the written consent of the manufacturer.

This product is designed and manufactured in Australia.