



HOT WATER HEATER CONTROL WITH HEAT RECOVERY

FEATURES

- Door interlocking isolator
- Indication for Panel Live, Heater on, Frost stat operated, and individual Supply and Extract Fan Run and Trip
- Individual On - Off switches for the Heater, Supply and Extract fans
- Fire alarm contacts for shutdown in fire situation
- Volt free common fault output
- Facia mounted 7 day time clock
- Hand Off Auto selector switch
- Temperature set points for heater and damper
- Frost protection thermostat to prevent coil freezing

CONNECTIONS

- 1 or 3 Phase Supply fan
- 1 or 3 Phase Extract fan
- LPHW Heater coil
- Frost thermostat
- Fire alarm circuit
- Duct sensor x 2
- Damper
- BMS enable
- Volt free common fault output

INSTALLATION INSTRUCTIONS

The control panel is designed for wall mounting in a clean, dry environment where the ambient temperature does not exceed 30°C.

A space approximately 50mm should be left around the enclosure to allow for heat dissipation.

Fix the enclosure to the wall using proprietary fixings. Remove the gland plate then drill and gland for necessary cable entry and exits.

Replace the gland plate and wire panel in accordance with the wiring diagram.

All wiring must comply with current regulations and be in compliance with the Health and Safety at Work Act.

LOOSE SUPPLY ITEMS

- Duct sensor x 2
- Frost thermostat

RATINGS

Required supply:

Supply fan:

Extract fan:

Heating coil: 0-10V modulating, 24V supply

Damper motor: 230V 50Hz

ENCLOSURE DETAILS

Finish: RAL 7035 textured

Cable entry: Top as standard, bottom on request.

Weatherproof: No as standard, weatherproof available on request.

DESCRIPTION OF CONTROLS

Panel is designed to control a LPHW heating valve, supply and extract fans, and a face / bypass damper. The temperature is controlled by the SB37 control PCB, this monitors the supply air via a duct sensor fitted in the duct at least 2M from the heating coil (see sensor positioning page). The heater can be switched on and off by the facia mounted heater switch, and has an on lamp on the facia to show the heating is enabled. The damper is controlled by the same SB37 pcb, this monitors a second duct sensor which is positioned in the fresh air duct. The fans have individual on/off switches on the panel facia, and individual run and trip indicators. A time clock is fitted to the panel facia (see separate sheet for time clock set up details), this controls the fan only, and can be overridden by the hand off auto switch (Hand = fans run 24/7, Off = fans off 24/7, Auto = fans are controlled by the time clock and bms contacts together). The frost stat (normally closed, open on frost) shuts down the fan and opens the heating valve, a lamp is fitted to the panel facia to show the frost stat has operated. The volt free common fault contacts will close if the frost stat operates or either of the fan overloads trip. The control panel is designed to be wired into the buildings fire alarm circuit, this will shut the panel down in the case of a fire.

The information provided in the literature is believed to be accurate (subject to change without notice), however, use of such information shall be entirely at user's own risk.

ENQUIRIES

+44 (0)1258 480802

Sarum Electronics Ltd

5 – 7 Holland Business Park, Holland Way
Blandford Forum, Dorset, DT11 7TA

www.sarumelectronics.co.uk | info@sarumelectronics.co.uk



Specialist Control Panels
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FAULT FINDING

CONTROL PANEL NOT WORKING?

The following should only be carried out by a skilled person as defined in BS7671 - Wiring Regulations

ARE THERE ANY LIGHTS ILLUMINATED ON THE CONTROL PANEL?

NO

Check electrical supply to panel and ensure isolator and switches are on. Ensure all M.C.B.S are on and any fuses are not blown.

YES, ONLY PANEL LIVE / CONTROL CIRCUIT LIVE

Check switches are on and fire alarm circuit is healthy.

Note: if no fire alarm circuit fitted, a written fire assessment from the responsible person must be obtained and kept with the panel allowing the circuit to be linked out. The fire alarm circuit allows the panel to work and shutdown in a controlled manner.

If there is still no lights on the panel check the time clock, BMS or external switches are all on.

WHERE SHOULD THE SENSOR BE POSITIONED?

Check with the system designer

FOR SUPPLY AIR TEMP

The sensor should be mounted in the duct at least 2 metres from the heater and as close to the supply grille into the supplied area as possible.

FOR HEAT RECOVERY

I.E. Face & bypass damper, heat wheel, recovery damper
The sensor should be mounted in the incoming fresh air supply duct.

FOR SPACE TEMP

The sensor should be fitted in a return air duct or use a room sensor.

FOR FROST HEATER

The mounting is often limited to the space between the frost and main heater. This sensor may need a cover to protect it from radiated heat and so prevent rapid changes in response.

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FAULT FINDING

TRIP OR FAULT LIGHT IS ON

FROST STAT OPERATED

Check wiring of frost stat is correct to the circuit diagram

HEATER TRIP

Check wiring of airflow switch and heater cutouts

Check fan is running correctly

AIRFLOW FAIL FILTER DIRTY

Check wiring of airflow switch is correct to the circuit diagram

Check duct is free from obstructions and fan is running correctly

Check filter is clear

FAN TRIP

Check fan size matches overload, then reset overload

Check fan wiring

All faults must be cleared for the controls to function correctly

Fans interlocked with electric heaters will run on after being switched off

VALVE OR ACTUATOR NOT WORKING

1. Check correct voltage actuator is fitted
2. Double check wiring from panel to actuator

3. Check if actuator operates without valve or damper connected
4. Check ant variable 0-10V signal varies when temperature set point adjusted

NO CHANGE TO HEAT OR COOL OUTPUT WHEN SET POINT IS ADJUSTED

Check that the correct factory supplied sensors are fitted and are not shorted or open

OTHER OR UNRESOLVED PROBLEMS

Ensure all wiring is correct and compliant with wiring regulations

Ensure that the panel wiring diagram number is noted and call your supplier

Please note that a skilled person with a test meter must be available when calling

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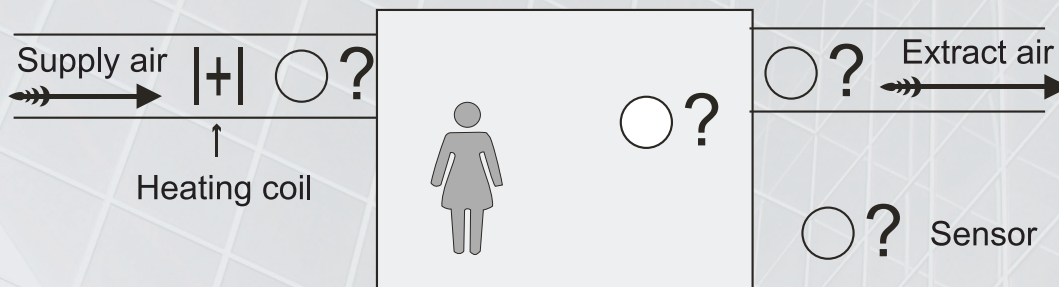
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HOT WATER HEATER CONTROL WITH HEAT RECOVERY

SENSOR POSITIONING

DUCT OR SENSOR ROOM



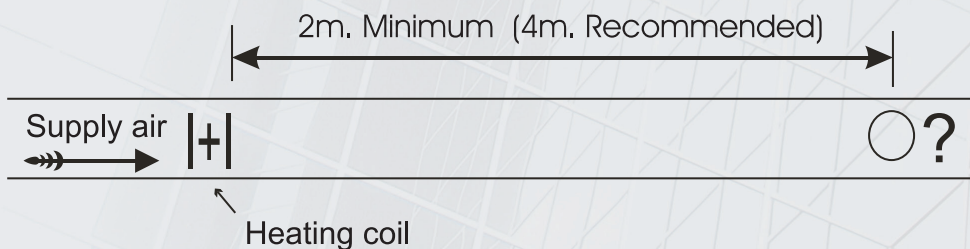
If the supply is for "make up" air, with background heating in the area being served, then a duct sensor should be used. The sensor must be mounted in the supply duct away from direct radiated heat.

The control panel will then maintain a constant duct air temperature by modulating the voltage feed to the heating valve.

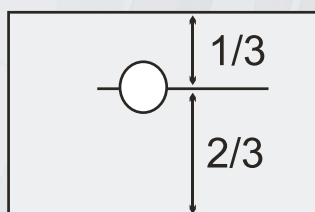
If the supply is for total area heating then a room sensor should be used. In some installations a duct sensor mounted in the extract / recirculation air duct may also be needed.

In this type of installation the system response time is very large and may cause the supply air to enter at very low or very high temperatures for some length of time. In some installations a duct sensor mounted in the extract or recirculation air may be used.

DUCT SENSOR



ROOM SENSOR



Position sensor away from direct sunlight, computers and other heat sources.

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SB37 MODULATING CONTROLLER

GENERAL FEATURES

Fan run on timer - Incorporated on the PCB approximately 2 minutes, this operates RL2 & LD1 illuminates

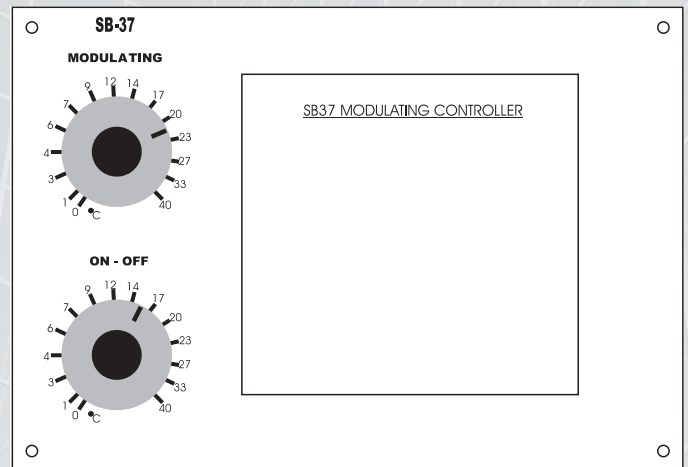
On/Off Output - Thermostatic output controlled by a sensor connected to terminals 11 & 12 of PCB, this operates relay RL3 & LD2 illuminates.

(Note - not used in all applications but typically for damper control or frost protection).

Modulating Output - Operated by a sensor connected to terminals 9 & 10 of PCB. Dial setting should be set to the temperature the area needs to maintain (typically 21-22°C). As the sensor detects small changes ie $\pm 1^\circ\text{C}$ there will be no change in voltage on terminals 5, 6 & 7 of PCB, where terminal 7 is the 0V common, terminal 5 is the 0-10V + cooling signal and terminal 6 is the 0-10V + heating signal.

If the sensor detects a large change ie $\pm 4^\circ\text{C}$ then the 0-10v signals will modulate to 10V output (the 0-10V can be used to control a modulating valve, or fed in to a step control circuit ie SB68 to give step outputs for heating or cooling, or both).

LED3 & 4 - LD3 cooling side, LD4 heating side. The glow intensity of the LED's will vary depending on the 0-10V outputs. LD4 will not operate if the fan circuit is off.



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CAPILLARY FROST THERMOSTAT

FEATURES

- Enclosed switch contacts
- Operating range: -35°C to +35°C
- Maximum bulb temperature: 50°C
- Capillary length: 1000mm
- Dimensions: 102 x 55 x 50mm

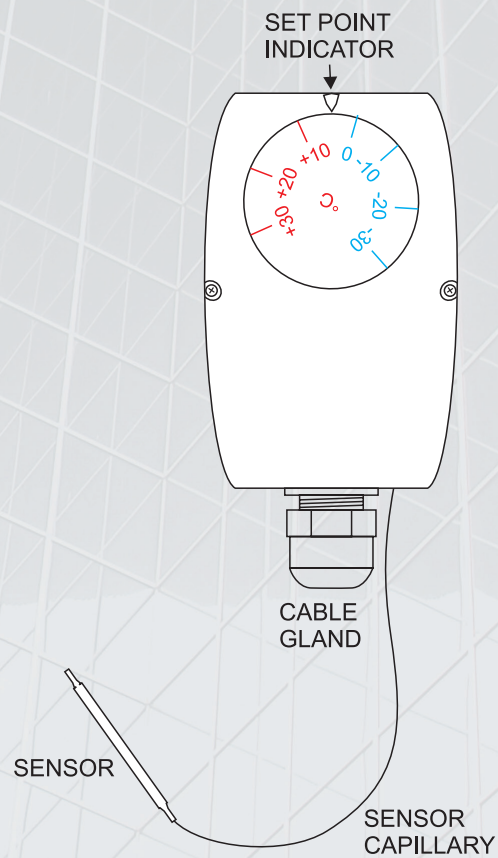
INSTALLATION INSTRUCTIONS

The frost stats sensor should be attached to the heating coil pipe work.

The frost stat should be set at around +5°C.

The capillary of the sensor should not be kinked at any stage.

Check the circuit diagram for wiring configuration, if the circuit shows N.C. use terminals C and 1, if the circuit shows N.O. use terminals C and 2.



N.B. MAXIMUM VOLTAGE 250VAC MAXIMUM CURRENT 16AMP RESISTIVE

WARNING : SWITCH OFF POWER BEFORE REMOVING PLASTIC COVER

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HOT WATER HEATER CONTROL WITH HEAT RECOVERY

NM230 / LM230 DAMPER ACTUATOR

FEATURES

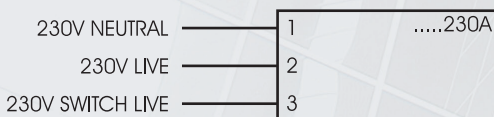
- For dampers up to approx. 1.5m² (NM230), up to approx. 1.0m² (LM230)
- Power open / close
- Available with auxiliary switch (NM/LM230A-S)
- Direction of rotation selector switch
- IP54 housing (bottom cable entry position)

IMPROVED FUNCTIONAL SAFETY

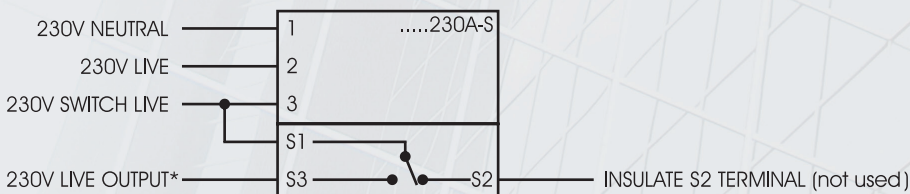
The damper actuator has no limit switches and is overload-proof. Its stops automatically when it reaches the damper or actuator end stop.

WIRING DETAILS

NM230A / LM230A



NM230A-S / LM230A-S



EASY FUNCTIONAL CHECK

A functional check of damper operation is simplicity itself: the gearing can be disengaged by simply pressing a pushbutton on top of the case, while the pushbutton remains depressed, the damper can be operated by hand.

SIMPLE INSTALLATION

The damper actuator is fitted with a universal spindle clamp for quick and easy mounting directly on the damper spindle. The actuator is supplied with an anti-rotational strap for fixing it in position.

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HOT WATER HEATER CONTROL WITH HEAT RECOVERY

TM-619 DIGITAL TIMER

GENERAL INFORMATION

This Panel-Mount Digital Timer is equipped with a replaceable Lithium CR2032 battery.

It has a 24 hour clock format.

The Timer is designed with up to 6 possible ON/OFF events programs per day.

The Timer provides 15 combinations of daily programs (see Fig.1)

PROGRAMMING THE TIMER

A. Functional description of buttons on panel.

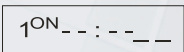
1. MANUAL: To select ON, AUTO or OFF
2. CLOCK: To adjust current day and time
3. TIMER: Programs review & setting programs
4. DAY: To adjust day of the week
5. HOUR: To adjust the hour
6. MIN: To adjust the minute
7. P : Reset Timer's settings
8. LED: To indicate ON/OFF status

B. Adjusting the clock

Press and hold CLOCK and then press DAY key, HOUR key, and MIN key to adjust the clock.

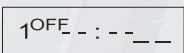
C. Programming the Timer

1. Press TIMER key, the screen will show

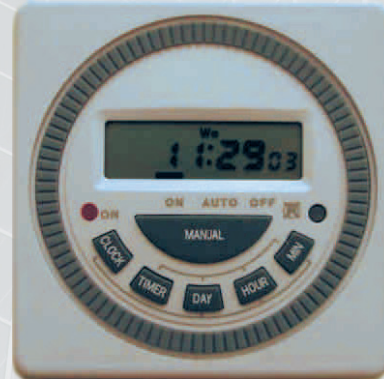


2. Press DAY key to select on of the 15 combinations of days of the week (see Fig.1). Continue to press the DAY key unit the required selection is shown on the display.

3. Press HOUR key and MIN key to set hour and minute for 1on.
4. After setting 1on press TIMER key again. The screen will show



5. Press DAY key to select the days of the week combination.



1.	MO	TU	WE	TH	FR	SA	SU
2.	MO						
3.		TU					
4.			WE				
5.				TH			
6.					FR		
7.						SA	
8.							SU
9.	MO	TU	WE	TH	FR		
10.						SA	SU
11.	MO	TU	WE	TH	FR	SA	
12.	MO	TU	WE				
13.				TH	FR	SA	
14.	MO		WE		FR		
15.		TU		TH		SA	

FIG. 1

NOTE: The days of the week combination for each ON/OFF program must be consistent.

6. Repeat the programming procedure to step 3 to set the hour and minute for 1OFF.

7. When setting of 1on and 1off is complete press TIMER key. Screen will show



8. Repeat the programming procedure above to complete all the required ON/OFF event periods.

9. When all ON/OFF periods have been set press CLOCK key to activate the timer.

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TM-619 DIGITAL TIMER

D. To review program settings
press TIMER key to scroll through each of the ON/OFF events.

E. To use the Override function

The override function is only effective when the Timer is running in AUTO mode.

Temporary override

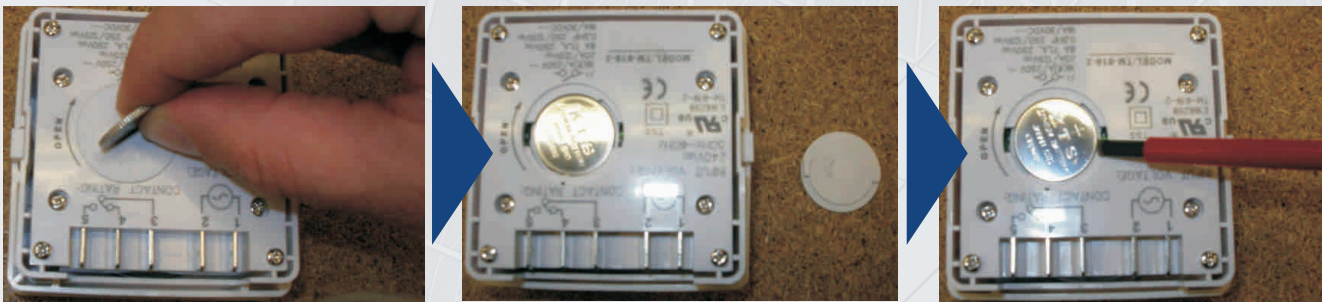
1. When the Timer's output status is On press the MANUAL key to change from AUTO to OFF. The Timer's output status will turn to OFF and all programs will be overridden. Press MANUAL again to switch the Timer's

status AUTO. The Timers output will remain OFF until the next program event call for ON. The Timer will then resume its automatic operation.

2. When the Timer's output status is OFF press the MANUAL key to change from AUTO to ON. The Timer's output status will turn to ON and all programs will be overridden. Press MANUAL again to switch the Timer's status to AUTO. The Timer's output will remain ON until the next program event calls for OFF. The Timer will then resume its automatic operation.

TO REPLACE TIMER'S BATTERY

LITHIUM CR2032

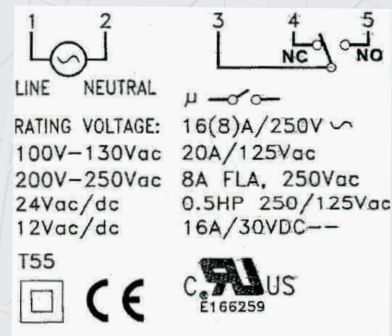


For voltage and electrical rating information please refer to the markings on the back of the Timer.

See the back of the Timer for proper wire connections.

Timer may need to be connected to a power source in order to set the program.

WIRING DIAGRAM



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