

SET 3M Electro-Mechanical Programmer



For time control of Domestic Central Heating

INSTALLATION INSTRUCTIONS

Technical Specifications

Power Supply	: 220/240Vac, 50/60Hz
Switch Action	: 2 x SPDT, type 1B
Switch Rating	: 220/240Vac, 50/60Hz, 3(1)A
Setting Accuracy	: ± 5 minutes
Timing Accuracy	: ± 1 min/month
Enclosure Rating	: IP30
Max. Ambient Temperature	: 45°C
Designed to meet BS EN60730-2-7	
Overall Dimensions	: 158mm wide, 98mm high, 58mm deep
Control Pollution Situation	: Degree 2
Rated Impulse Voltage	: 2.5KV
Ball Pressure Test	: 75°C

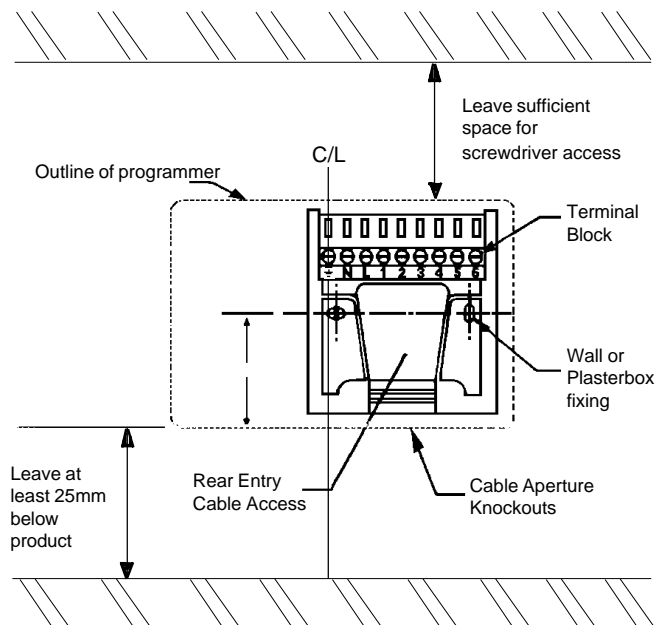
This product complies with the following EC Directives:
Electro-Magnetic Compatibility Directive.
 (EMC) (89\336\EEC), (92\31\EEC)
Low Voltage Directive.
 (LVD) (73\23\EEC), (93\68\EEC)

CE

The unit must be installed by a competent electrician and the installation should conform to IEE Wiring Regulations. The supply to this unit should be wired via a full disconnect in accordance with BS EN60730-1, i.e., one which provides air gaps of at least 3mm in both poles of the mains, and incorporates a 3 amp. fuse. It is strongly recommended that solid conductors be used.

Installation and Wiring

1. Select the desired fixing position for the heating controller.
2. When fixing the wallplate remember that the connections are at the top and that the vertical centre line of the unit is at the position shown (C/L). (in line with terminal $\overline{=}$.)
3. Fix the wallplate to the wall or flush mounted box as required.
4. Surface cables can only enter from below the unit. If mounted on a flush mounted box, cables can enter from the rear through the aperture in the wallplate.
5. For mains voltage applications links must be fitted between terminals L, 2 and 5.
6. Whilst the unit does not require an Earth connection, a terminal is provided on the wallplate for Earth continuity purposes.
7. Overleaf are typical wiring diagrams which together with the information above should enable all the services to be connected correctly.
8. Ensure all dust and debris are cleared from the area.
9. The unit is shipped ready for use in systems having PUMPED primaries.
 For systems having GRAVITY primaries, fit the small plastic shorting link (which can be found taped below the left hand fixing screw hole of the wallplate) over the two pins on the rear of the plug in module. These pins can be found in the recess near to the bottom edge of the plug-in module.
10. Locate the module on the latches at the bottom of the wallplate and hinge upwards to fully engage the unit connectors into the wallplate. Tighten the two fixing screws to secure the unit to the wallplate.
11. Before setting the programme, the unit and circuits should be checked. Switch ON the mains supply and press both WATER and HEATING rocker switches to the CONSTANT position, both red LED's should now be illuminated. Adjust any remote thermostat to check the services operate correctly.
12. Then press both WATER and HEATING rocker switches to the OFF position and check that both services do not operate.
13. Finally, press both WATER and HEATING rocker switches to "Timed Position" prior to programming the unit.



Mains Supply			Water			Heating		
VIA	3A	FUSE	ON	COM	OFF	ON	COM	OFF
$\overline{=}$	N	L	1	2	3	4	5	6

Typical Wiring Diagrams

Given below are typical wiring diagrams for various types of systems. Whilst every attempt has been made to ensure the accuracy of this information it is recommended that the specific information relating to the ancillary controls is obtained from the manufacturers concerned.

<p>Typical Gravity D.H.W. Pumped HTG.</p> <p>SET 3M (GRAVITY)</p>	<p>Typical fully pumped system with S.R.Z.V. in HTG.</p> <p>SET 3M (GRAVITY)</p>	<p>Typical Gravity D.H.W. pumped HTG with S.R.Z.V. in D.H.W.</p> <p>SET 3M (PUMPED)</p>
<p>Other Danfoss Randall products suitable for use with the above control circuit:- RMT Room Thermostat.</p>	<p>Other Danfoss Randall products suitable for use with the above control circuit:- AT Cylinder Thermostat. RMT Room Thermostat. HP22 or HP28 Motorised Zone Valve with Spring Return Actuator and SPST auxiliary switch.</p>	<p>Other Danfoss Randall products suitable for use with the above control circuit:- AT Cylinder Thermostat. RMT Room Thermostat. HP28C Motorised Zone Valve with Spring Return Actuator and SPDT auxiliary switch.</p>

<p>Typical fully pumped system with 3 port Mid-position Valve.</p> <p>SET 3M (PUMPED)</p>	<p>Typical fully pumped system with S.R.Z.V. in each service.</p> <p>SET 3M (PUMPED)</p>	<p>Typical fully pumped system with F.M.Z.V. in each service.</p> <p>SET 3M (PUMPED)</p>
<p>Other Danfoss Randall products suitable for use with the above circuit:- AT Cylinder Thermostat. RMT Room Thermostat. HS3 Three Port Mid-position Valve with a Spring Return Actuator.</p>	<p>Other Danfoss Randall products suitable for use with the above circuit:- AT Cylinder Thermostat. RMT Room Thermostat. 2 x HP22 or HP28 Motorised Zone Valve with Spring Return Actuator and SPST auxiliary switch.</p>	<p>Other Danfoss Randall products suitable for use with the above circuit:- AT Cylinder Thermostat. RMT Room Thermostat.</p>

NOTE:

S.R.Z.V. = spring return zone valve. F.M.Z.V. = fully motorised zone valve.
Ensure Earth continuity throughout, where Earth is required.

Danfoss Randall manufacture a complete range of domestic heating controls including timeswitches and programmers, room and cylinder thermostats, thermostatic radiator valves, motorised valves and boiler efficiency controls; as well as a comprehensive range of commercial time controls and valves. Ask for our full colour Product Selection Guide.

**THE DANFOSS RANDALL SET 3M ELECTRO-MECHANICAL PROGRAMMER
AS A REPLACEMENT IN EXISTING PROGRAMMES**

Plug-In Compatability

SET 3M is a direct plug-in replacement for any existing programmers utilising the British Gas Standard Wallplate, this includes the Horstmann 425 Tiara and Diadem electro-mechanical and 525 and 527 electronic programmers.

Conversion From Other Models

Some time controls are connected in different ways depending upon the type of system and/or the controls which are fitted. Consult the column headed "**NOTE: This conversion applies only if.....**" to determine how the SET 3M programmer's GRAVITY or PUMPED link should be set. If there is any doubt about the way in which the existing programmer is connected, consult our Technical Services Department before proceeding with replacement.

(A) FULLY PUMPED SYSTEMS

Danfoss Randall SET 3M (PUMPED)	MAINS			WATER			HEATING			NOTE: This conversion applies only if.....	An additional terminal block is required where these disconnected leads (or pairs of leads) should be terminated			
	E	N	L	ON	CO-M	O-FF	ON	CO-M	O-FF		A	B	C	D
	E	N	L	1	2	3	4	5	6					
Danfoss Randall 922/972	≡	N	L	3	2	1	6	5	4	Pumped/Gravity link is set to pumped				
Glowworm Mastermind	≡	N	L	3	-	1	4	-	2	Pumped/Gravity link is set to pumped				
Horstmann 423 Amethyst 7 & 10	≡	2,3	1	5	-	4	7	-	6		8			
Horstmann 424 GEM	≡	2,3	1,1-0	4	5	6	7	8	9	Terminals 5,8 & 10 are linked				
Horstmann Leucite 423 & 424	≡	2	1	3	5	4	6	7	8	Terminals 5 & 7 are linked				
Honeywell ST669	≡	N	L	6	8	7	3	5	4					
Landis & Gyr RWB2	≡	N	L	3	-	1	4	-	2	Pumped/Gravity link is set to pumped				
Potterton Mini-Minder	≡	N	L	3	-	1	4	-	2	Pumped/Gravity link is set to pumped				
Potterton EP2000, EP3000	≡	N	L	3	-	1	4	5	2	Pumped/Gravity link is set to pumped	A	B	C	D
Randall 3033	≡	1,7	6	4	-	5	2	-	3					
Danfoss Randall 4033	≡	7	6	4	1	5	2	-	3					
Sangamo Form 1 410 & 414	≡	4,5	6	1	3	2	8	-	7					
Sangamo S409/1	≡	N, 1,3	L	2	-	-	5	-	-		6,4			
Sangamo S409/3	≡	3,6	7	5	-	4	1	-	2					
Satchwell 'Libra' & DHP 2201	≡	1	2	6	7	8	3	4	5					
Satchwell ET 1401 & ET 1451	≡	1	2	7	6	8	4	3	5					
Smith Ind. Centroller 90	≡	1	2	5	-	-	4	-	-		3	6		
Smith Ind. Centroller 1000	≡	N	L	3	-	1	4	-	2	Pumped/Gravity link is set to pumped				
Switchmaster 800 & 805	≡	N	L	3	-	4	1	-	2					
Switchmaster 900 & 9000	≡	N	L	3	-	4	1	-	2	Pumped/Gravity link is set to pumped	A	B	C	
Venner CHC/W2 (with stat)	≡	N, 2,4	L	1	-	-	A/S	-	-		A/-S, 3A-/S,3			
Venner CHC/W2 (air stat linked)	≡	N, 2,4	L	1	-	-	3	-	-					
Venner Venotrol 80M & 80PM (with air stat)	≡	N,3	L	2	-	1	A/S	-	4	} used in a system having independent control of hot water	A/-S,5			
Venner Venotrol 80M & 80PM (air stat linked)	≡	N,3	L	2	-	1	5	-	4					

(B) GRAVITY DHW PUMPED HEATING SYSTEMS

Danfoss Randall SET 3M (GRAVITY)	MAINS			WATER			HEATING			NOTE: This conversion applies only if.....	An additional terminal block is required where these disconnected leads (or pairs of leads) should be terminated			
	E	N	L	ON	CO- M	OF- F	ON	CO- M	OF- F		A	B	C	D
	E	N	L	1	2	3	4	5	6					
Danfoss Randall 922/972	≡	N	L	3	2	1	6	5	4	Pumped/Gravity link is set to gravity	4,7	5	6	
Glowworm Mastermind	≡	N	L	3	-	1	4	-	2					
Horstmann Coral 423 & 424	≡	2,3	1	Boiler (8)	-	-	AirStat (8)	-	-		4,7	5	6	
Horstmann Diamond 423	≡	N	L, 1,3		2	-		-	4					
Horstmann Diamond 424	≡	N	L, 1,3	2	-	-	4	-	-	5				
Landis & Gyr RWB2	≡	N	L	3	-	1	4	-	2	Pumped/Gravity link is set to gravity				
Potterton 423	≡	N	L, 1,3	2	-	-	4	-	-	5	6			
Potterton Mini-Minder	≡	N	L	3	-	1	4	-	2	Pumped/Gravity link is set to gravity				
Potterton EP2000	≡	N	L	3	-	1	4	5	2	Pumped/Gravity link is set to gravity	A	B	C	D
Danfoss Randall 3060 & 3020P	≡	1,7	6	4	-	-	2	-	-		3	5		
Danfoss Randall 102	≡	5	3,6	1	-	-	2	-	-					
Satchwell 'Libra' & DHP 2201	≡	1	2	6	7	8	3	4	5					
Sangamo M5 410 Form 4	≡	4,5	3	1,6	-	2	8	-	7	Terminals 1 & 6 are linked				
Sangamo S409 Forms 1 & 4	≡	N,1,3	L	2	-	-	5	-	-		4,6			
Sangamo (early model) S410 Form 4	≡	N,2	L	1,3	-	-	4	-	-	Terminals 1 & 3 are linked				
Smith Ind Centroller 100	≡	N	L	3	-	-	2	-	-		1	4		
Smith Ind Centroller 60	≡	1	2	5	-	-	4	-	-		3			
Smith Ind. Centroller 10	≡	N	L	3	-	-	2	-	-		1,4			
Smith Ind. Centroller 70	≡	1	2	5	-	-	4	-	-		3	6		
Smith Ind. Centroller 1000	≡	N	L	3	-	1	4	-	2	Pumped/Gravity link is set to gravity				
Switchmaster 320 & 350	≡	N	4,L	3	-	-	1	-	-	Terminals L & 4 are linked	2			
Switchmaster 400	≡	N	L	3	-	-	1	-	4		2			
Switchmaster 600	≡	N	L	3	-	-	1	-	-		2	4		
Switchmaster 900 & 9000	≡	N	L	3	-	4	1	-	2	Pumped/Gravity link is set to gravity	A	B	C	
Venner Venotrol	≡	N,A,- M	L, L,1	V	-	-	S,F	-	-		T,P	O		
Venner Venotrol 80 (air stat)	≡	N,1,- 3,4	L	2	(air stat)	-	A/S	-	-		A/ S,5			
Venner Venotrol 80 (air stat linked)	≡	N,1,- 3,4	L	2	-	-	5	-	-					
Venner CHC/W2 (air stat)	≡	N,2,4	L	1	-	-	A/S	-	-	} used in a system having control of water only, or water & heating together	A/ S,3			
Venner CHC/W2 (air stat linked)	≡	N,2,4	L	1	-	-	3	-	-					
Venner Venotrol 80P (air stat)	≡	N,1,3	L	2	-	-	A/S	-	4		A/ S,5			
Venner Venotrol 80P (air stat linked)	≡	N,1,3	L	2	-	-	5	-	4					



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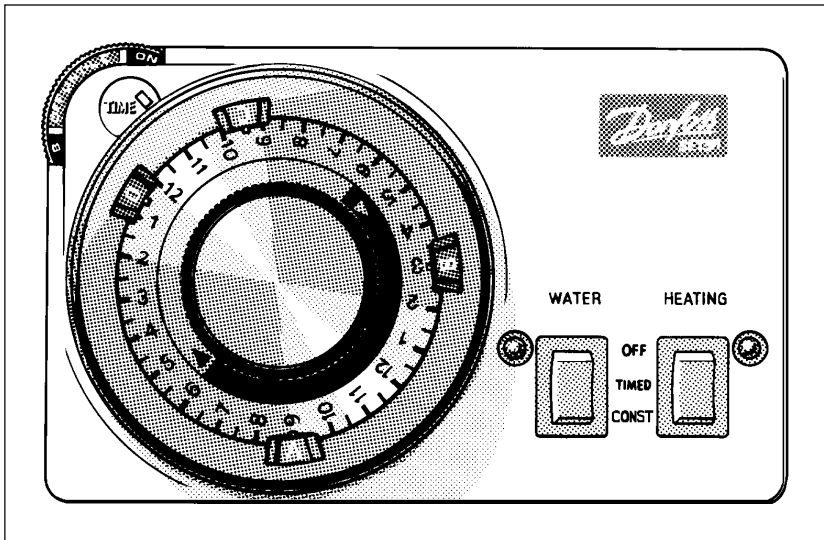
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SET 3M



Electro-Mechanical 24 Hour Programmer

USER INSTRUCTIONS



GENERAL DESCRIPTION

The SET 3M Programmer will control your Heating and Hot Water system automatically, to save you the trouble of having to manually switch the system on and off every day.

The unit incorporates several useful features to make its operation as flexible as possible, but without adding complications, these include:

1. Easy to read dial which shows time of day and which provides 2 ON periods and 2 OFF periods, each 24 hours.
2. A thumbwheel, which provides information on the programme status. The thumbwheel also provides facilities to advance programmed events.
3. Two 3-position rocker switches, entitled "Water" and "Heating" respectively. These switches provide three options for both Heating and Water.
OFF - Service is manually switched OFF and stays off until switch position is altered.
TIMED - Service follows programme set on dial and any advance functions selected on thumbwheel.
CONSTANT - Service is manually ON and stays on until switch position is altered.

The switches allow Heating and Hot Water to be operated, together or independently of each other. Useful for example in the summer when water only is required.

NOTE: With certain designs of systems, it is not possible to operate Heating without Hot Water.

4. To allow an "at a glance" indication of whether the system is "ON" or "OFF", two convenient red LED indicators, one for Heating, the other for Hot Water, are incorporated in the programmer front plate.

PROGRAMMING

The inner part of the round programming dial on the SET 3M is divided into two twelve hour segments.

The night segment covers the period 6:00pm to 6:00am and is coloured black. The day segment, covering the period 6:00am to 6:00pm has a bright aluminium finish.

It is important to remember this when setting the programme tappets and time of day.

1. SETTING THE PROGRAMME (TAPPETS A, B, C, D)

- i) Remove the dial Cover by turning slightly to the left and pull off.
- ii) Decide when you want the ON periods. While gripping the dial knob, slide the dial tappets firmly to the required times. The tappets may be quite stiff to move.

If you want to switch ON between 8 a.m. and 10.00 a.m. and again between 4 pm and 11 pm, set the tappets as shown.

- | | |
|--------------------|-------------------------|
| A to 8:00 (day) | - First "ON" each day |
| B to 10:00 (day) | - First "OFF" each day |
| C to 4:00 (day) | - Second "ON" each day |
| D to 11:00 (night) | - Second "OFF" each day |

Remember : Red tappets (A & C) switch ON
Blue tappets (B & D) switch OFF

- iii) Using the dial knob, rotate the dial clockwise completely at least twice, to clear the mechanism.

NOTE: Tappets can be moved around the dial in a clockwise or anti-clockwise direction as convenient.

2. SETTING THE TIME OF DAY

Suppose it is 3.00 p.m. when you are making this adjustment. Using the dial knob, rotate the dial (clockwise only) until "3" on the DAY segment of the dial is next to the "Time" mark.

Remember you will have to re-set the time after a power-cut - and also when the clocks change in Spring and Autumn.

IMPORTANT: Any adjustment to the Time of Day setting must be made by rotating the dial **clockwise only**.

Replace dial cover when setting has been complete.

3. SELECTING THE SERVICES

Use the rocker switches on the right of the front panel to select the required operation, the options are shown below.

WATER	HEATING
OFF	OFF
TIMED	TIMED
CONSTANT	CONSTANT

NOTE: With certain designs of heating systems, it is not possible to operate Heating without Hot Water.

- The SET 3M has now been set, and the current state of the programmer can be seen by looking at the red indicators and the thumbwheel at the top left-hand corner of the unit (e.g. "OFF UNTIL C" etc).
- The thumbwheel at the top left-hand corner of the programmer can also be used to pre-select the next operation. The table below shows the options which are available dependant upon the current position of the programming dial.

PROGRAMME ADVANCE OPTIONS AVAILABLE USING THUMBWHEEL

Current position of tappets to "TIME" mark	Overrides Available				Comments
	OFF until "A"	ON until "B"	OFF until "C"	ON until "D"	
Time mark aligns with tappet A					Do not use thumbwheel
Time mark between tappets A & B	●		●	●	
Time mark aligns with tappet B					Do not use thumbwheel
Time mark between tappets B & C	●	●		●	
Time mark aligns with tappet C					Do not use thumbwheel
Time mark between tappets C & D	●	●	●		
Time mark aligns with tappet D					Do not use thumbwheel
Time mark between tappets D & A		●	●	●	

To select the required override, simply rotate the thumbwheel **anti-clockwise** until the thumbwheel displays the next wanted event.

NOTE: Do not attempt to operate the thumbwheel whilst a tappet is in the immediate vicinity of the "Time" mark, as this may cause the actual time of day setting of the clock to be altered, which would necessitate re-setting as described in section 2.



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