

BPRO-4 Boiler Sequencer Pro

The Boiler Sequencer Pro module is designed for use with Direct Digital Controllers or BMS Outstations to convert an analogue output signal to four stages of relay output. The module has built-in logic to rotate the boiler sequencing automatically. The automatic rotation is typically used with boilers to provide similar running hours for each them, and therefore extending the lifetime of the boilers.

The module can be configured for three or four Boiler output, Auto or Standard Sequence control. When the device is configured for standard sequencing it may be used for example with 4 stage electric heater battery.

LEDs indicate relay output status and on board jumpers select Auto/On/Off, if required an optional remote Auto/On/Off switch can be supplied.



FEATURES:-

- Microprocessor Based
- Provides four SPDT relay output channels
- LED status indication
- Auto/On/Off Jumper for system checkout
- Power fail restart
- Unique Input verification for correct seamless Output with no Dead spot
- Hysteresis for all operation modes 150 mV.
- On board timers for outputs which eliminate relay bounce
- Designed for DIN rail mounting
- Rising cage terminals

Model Types	Model	Description
	BPRO-4	BPRO-4 Boiler Sequencer Pro, up to 4 Boilers
Technical Data	Power Supply	24 V ac/dc (+/- 15 %) at 80mA
	Inputs	0-10 Vdc @ 1mA (max)
	Outputs	4 x 10A resistive 240 Vac SPDT Relays
	Operating Modes	DIP Switch Selectable 16 Modes Auto Sequence Control 1-2-3 Auto Sequence Control 1-2-3-4 Fixed Sequence Control
	Factory Set Timers	Relay On 2 sec after input stabilizes. Relay will only go off after another valid input is present for 2 sec. Auto sequence change over after 30 sec. Inter stage relay timer 3 sec.
	LED Indication	ON when relay is energised
	Manual Control	Each output can be manually overridden ON, OFF, AUTO using jumpers
	Terminals	0.5 – 2.5 mm ² cable
	Ambient Temperatures	-10 to +50°C
	Mounting	DIN rail
Dimensions	W90 x H72 x D50 mm	

Operation

The input signal (0-10 VDC) from the BMS controller is converted to the correct relay outputs via the on board microprocessor. The following sequencing options are available. These sequences are available as ramp up sequences or as auto rotation sequences depending on the bit switch settings.

3 Stage Control

Volts	2.4V	4.8V	7.2V	9.6V
Boiler 1	OFF	ON	ON	ON
Boiler 2	OFF	OFF	ON	ON
Boiler 3	OFF	OFF	OFF	ON

4 Stage Control

Volts	1.2V	2.4V	4.8V	7.2V	9.6V
Boiler 1	OFF	ON	ON	ON	ON
Boiler 2	OFF	OFF	ON	ON	ON
Boiler 3	OFF	OFF	OFF	ON	ON
Boiler 4	OFF	OFF	OFF	OFF	ON

2 Boiler Low High Stage Control

Volts	1.2V	2.4V	4.8V	7.2V	9.6V
Boiler 1 Low	OFF	ON	ON	ON	ON
Boiler 1 High	OFF	OFF	ON	ON	ON
Boiler 2 Low	OFF	OFF	OFF	ON	ON
Boiler 2 High	OFF	OFF	OFF	OFF	ON

2 Boiler Low Low Stage Control

Volts	1.2V	2.4V	4.8V	7.2V	9.6V
Boiler 1 Low	OFF	ON	ON	ON	ON
Boiler 1 High	OFF	OFF	OFF	ON	ON
Boiler 2 Low	OFF	OFF	ON	ON	ON
Boiler 2 High	OFF	OFF	OFF	OFF	ON

Auto Sequencing

The change in sequence is achieved by either the heating demand falling to zero for a pre-determined period in an occupation period or at the end of an occupation period.

Three Boiler Control

1-2-3
2-3-1
3-1-2

Four Boiler Control

1-2-3-4
2-3-4-1
3-4-1-2
4-3-2-1

Low High Boiler Control

1-2-3-4
3-4-1-2

Low Low Boiler Control

1-3-2-4
3-1-4-2

Relay Operation

Upon input voltage verification the output relays will have a 2 seconds ON delay and 2 second OFF delay.

Manual Control

For commissioning and check out each relay is equipped with Auto Off On jumper.

Installation Instructions

MECHANICAL

A) Position the top edge over the Din rail and press the sprung edge firmly onto the rail so that the module is secure. The module is designed to fit on a standard top hat profile DIN rail (DIN EN 50 022) and other standard rails.

ELECTRICAL

B) Ensure that the controller and module power is turned off.

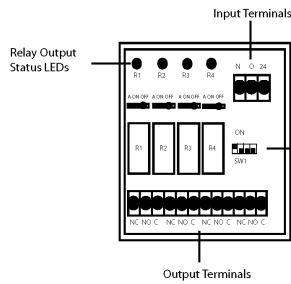
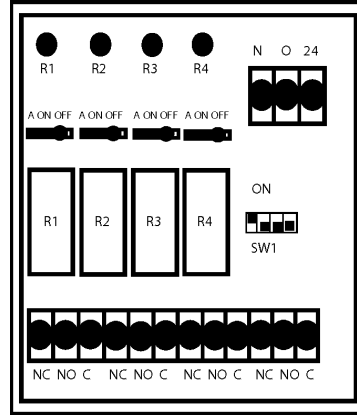
C) Set the DIP switch to the required operating mode as shown.

D) Connect the MOD 4 QRM to the controllers output as shown.

E) Connect the field wiring as shown to the plant as required.

F) Connect the 24 Vac / dc power supply to the MOD 4 QRM.

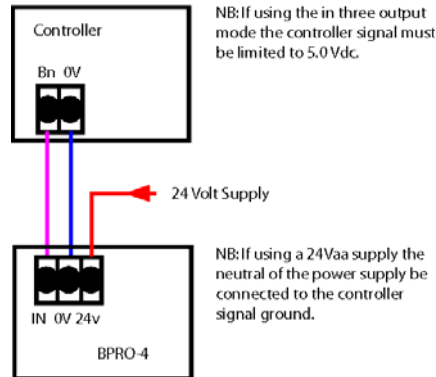
G) Power up the module and controller.



MODE SWITCH	ACTION	MODE SWITCH	ACTION
ON	AUTO 3 STAGE	ON	MANUAL SEQUENCE 1234
ON	AUTO 4 STAGE	ON	MANUAL SEQUENCE 2341
ON	AUTO SEQUENCE LOW HIGH	ON	MANUAL SEQUENCE 3412
ON	AUTO SEQUENCE LOW LOW	ON	MANUAL SEQUENCE 4123
ON	AUTO SEQUENCE LOW HIGH / LOW LOW	ON	MANUAL SEQUENCE LOW HIGH 1234
ON	MANUAL SEQUENCE 123	ON	MANUAL SEQUENCE LOW HIGH 3412
ON	MANUAL SEQUENCE 231	ON	MANUAL SEQUENCE LOW LOW 1324
ON	MANUAL SEQUENCE 312	ON	MANUAL SEQUENCE LOW LOW 3142



It is recommended that the installation should comply with the HSE Memorandum of Guidance on Electricity at work regulations 1989.

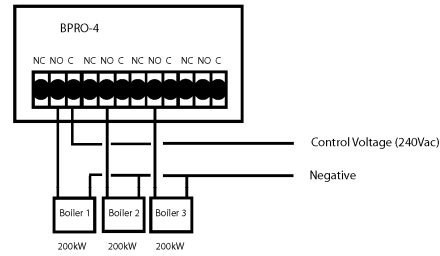


Wiring Diagram

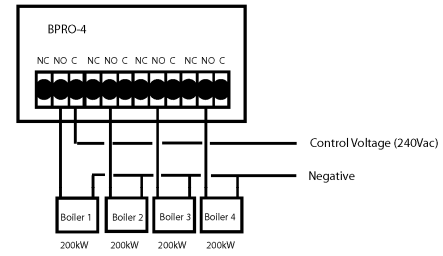


The electrical installation, device connection and commissioning can only be carried out by qualified professionals and according to the local wiring regulations!

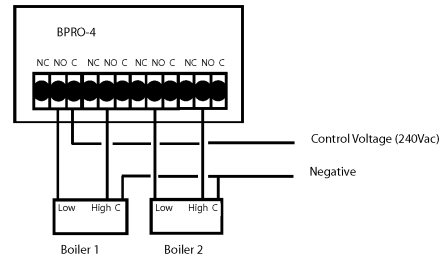
3 STAGE SEQUENCE CONTROL



4 STAGE SEQUENCE CONTROL



LOW HIGH / LOW LOW STAGE SEQUENCE CONTROL



The module enable signal should be connected to the boiler control circuit as directed by the manufacturers recommendations and wiring instructions.

The Boiler BPRO-4 is not a safety device, all boiler safety devices should be tested for correct operation before switching electrical power on.