

## BPRO-4A Analogue Boiler Sequencer

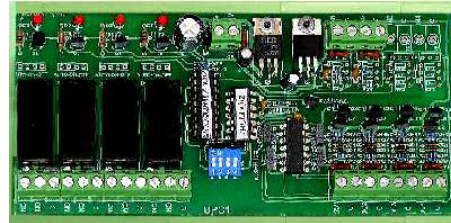
The BPRO-4A module is purposely designed for use with Direct Digital Controllers to convert a single analogue output signal into four sequenced, enable relay and 0-10v output stages.

The BPRO-4A is able to rotate the lead output sequence to even out plant utility over its stages, these typically being boilers, thyristors, VFD's, or chillers. One unique user selectable feature is the devices ability to automatically rotate lead stages during a period of no demand from the DDC controller allowing plant to be continuously changed on each new loop cycle.

Applications include the control of multiple condensing boilers with 0-10v control signals, multiple stage chillers and air handling units with heating, damper, cooling sequences relays being used to indicate demand.

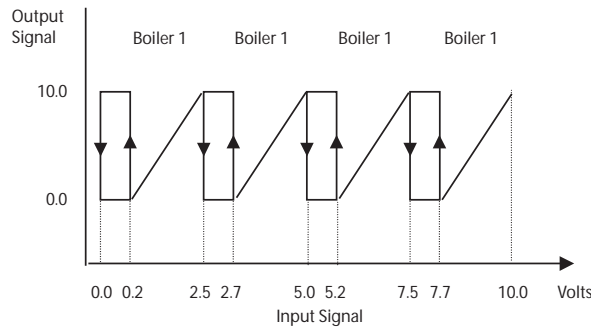
### Features

- LED Status Indication
- DIP Switch Selection of the Operating Mode
- Auto or remote changeover of the sequence
- DIN-rail Mounting



Model Type	Model	Description
	<b>BPRO-4A</b>	Analogue Boiler Sequencer for up to 4 0-10Vdc Controlled Boilers.
<b>Technical Data</b>	Input Signal	0-10Vdc @ 1mA (max)
	Digital Input1	1 x Sequence Rotation (volt-free)
	Relay Outputs	4 x 10 Amp @ 240Vac Resistive
	Analogue Outputs	4 x 0-10Vdc @ 20mA
	Power Supply	24Vac ( 15%) @ 160mA
	Operating Modes	DIP Switch Selectable 14 Modes Auto Sequence Control 1-2-3-4 Auto High Low, Low Low Control Manual Sequence Control Other configurations available on request.
	Factory Set Timers	Relay On 10 sec after input stabilises. Total ramp time 90 secs Auto sequence change-over after 30 sec input < 0.5Vdc
	LED Indication	ON when relay energised
	Wiring Terminals	0.5 .. 2.5 mm cable terminals
	Mounting	DIN rail
	Ambient Temp	-10 .. + 50°C
Dimensions	W180 x H80 x D50 mm	

**Operating Sequence**



The diagram on the left illustrates the operation sequence of the BPRO-4A.

**4 Stage Auto Boiler Control (AUTO 1 2 3 4)**

When the control signal increased first the relay 1 is switched on, then the analogue output 1 is ramped up, following with stage 2, 3 and 4. When the voltage signal drops the sequence is reversed.

Please note that the BPRO-4A has multiple sequencing options, refer

to the Bit Switch Settings section.

**Boiler Sequencing**

The following Bit Switch Settings Illustrate the available options for the boiler sequencing.

Example: Auto Sequence LOW HIGH/ LOW HIGH will first ramp up output 1 then output 3 after which output 2 and 4 are ramped up. After the lead boiler rotation output 3 is first ramped up, then output 1 followed by output 4 and output 2.

MODE SWITCH	ACTION	MODE SWITCH	ACTION
ON	AUTO 1234 (4 BOILERS)	ON	FIXED SEQUENCE 3412
ON	AUTO SEQUENCE LOW HIGH / LOW HIGH (2 BOILERS)	ON	FIXED SEQUENCE 4123
ON	AUTO SEQUENCE LOW LOW / HIGH HIGH (2 BOILERS)	ON	FIXED SEQUENCE 1 LOW / 1 HIGH / 3 LOW / 4 HIGH
ON	DIGITAL 1234 (4 BOILERS)	ON	FIXED SEQUENCE 3 LOW / 4 HIGH / 1 LOW / 2 HIGH
ON	DIGITAL LOW HIGH / LOW HIGH	ON	FIXED SEQUENCE 1LOW / 3 LOW / 2 HIGH / 4 HIGH
ON	DIGITAL LOW LOW / HIGH HIGH	ON	FIXED SEQUENCE 3LOW / 1 LOW / 4 HIGH / 2 HIGH
ON	FIXED SEQUENCE 1234	ON	SPARE
ON	FIXED SEQUENCE 2341	ON	SPARE

**4 STAGE CONTROL**

Volts	0.08	0.2	2.7	5.2	7.7
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

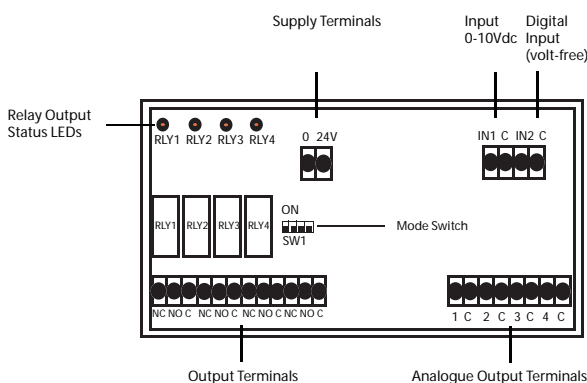
**DUAL BOILER LOW HIGH STAGE CONTROL**

Volts	0.08	0.2	2.7	5.2	7.7
Boiler 1 Low	OFF	ON	ON	ON	ON
Boiler 2 High	OFF	OFF	ON	ON	ON
Boiler 2 Low	OFF	OFF	OFF	ON	ON
Boiler 2 High	OFF	OFF	OFF	OFF	ON

DUAL BOILER LOW LOW STAGE CONTROL

Volts	0.08	0.2	2.7	5.2	7.7
Boiler 1 Low	OFF	ON	ON	ON	ON
Boiler 2 High	OFF	OFF	OFF	ON	ON
Boiler 2 Low	OFF	OFF	ON	ON	ON
Boiler 2 High	OFF	OFF	OFF	OFF	ON

Wiring Instructions



Ensure that the controller and module power is turned off.

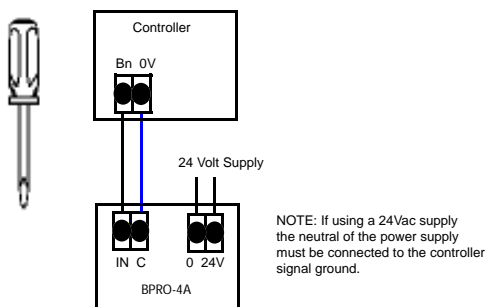
C ) Set the DIP switch to the required operating mode.

D ) Connect the BPRO-4A 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 BPRO-4A.

G ) Power up the module and controller.



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

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