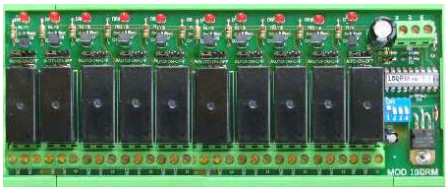
BPRO-10 Boiler Sequencer Pro



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 up to ten boilers, Auto or Standard Sequence control. When the device is configured for standard sequencing it may be used for example with 10 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 ten 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-10	BPRO-10 Boiler Sequencer Pro, up to 10 Boilers or up to 5 Lo/Hi boilers

Technical Data

Power Supply	24 V ac/dc (+/- 15 %) at 180mA
Inputs	0-10 Vdc @ 1mA (max)
Outputs	10 x 10A resistive 240 Vac SPDT Relays
Operating Modes	7 Operating Modes; Auto Sequence and Manual 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	W190 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.

AUTOMATIC SEQUENCING
The automatic change in sequence is achieved by the heating demand falling to less than 0.5 volts for more than 30 seconds, this action can be assigned by the BEMS system.

RELAY OPERATION
Upon input voltage verification the output relays will have a 5 seconds ON delay and 2 second OFF delay.

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

DIP SWITCH POSITION 1 (AUTO 1 2 3 4 5 6 7 8 9 10)

Boiler control similar to DIP switch 5 but auto change of sequence on no heating demand as below:
1-2-3-4-5-6-7-8-9-10
2-3-4-5-6-7-8-9-10-1
3-4-5-6-7-8-9-10-1-2
4-5-6-7-8-9-10-1-2-3
5-6-7-8-9-10-1-2-3-4
6-7-8-9-10-1-2-3-4-5
7-8-9-10-1-2-3-4-5-6
8-9-10-1-2-3-4-5-6-7
9-10-1-2-3-4-5-6-7-8
10-1-2-3-4-5-6-7-8-9

DIP SWITCH POSITION 2 (AUTO LOW HIGH)

Boiler control similar to DIP switch 6 but auto change of sequence on no heating demand as below:
1-2-3-4-5-6-7-8-9-10
3-4-5-6-7-8-9-10-1-2
5-6-7-8-9-10-1-2-3-4
7-8-9-10-1-2-3-4-5-6
9-10-1-2-3-4-5-6-7-8

DIP SWITCH POSITION 3 (AUTO LOW LOW)

Boiler ON then Boiler ON until all boilers ON then high flame similar to DIP switch 7 but auto change of sequence on no heating demand as below:
1-3-5-7-9-2-4-6-8-10
3-5-7-9-1-4-6-8-10-2
5-7-9-1-3-6-8-10-2-4
7-9-1-3-5-8-10-2-4-6
9-1-3-5-7-10-2-4-6-8

DIP SWITCH POSITION 4 (AUTO LOW HIGH / LOW LOW)

Boiler ON then High flame until all sequences then Boiler ON then Boiler ON until all boilers ON then high flame with auto change of sequence on no heating demand as below:
1-2-3-4-5-6-7-8-9-10
3-4-5-6-7-8-9-10-1-2
5-6-7-8-9-10-1-2-3-4
7-8-9-10-1-2-3-4-5-6
9-10-1-2-3-4-5-6-7-8
1-3-5-7-9-2-4-6-8-10
3-5-7-9-1-4-6-8-10-2
5-7-9-1-3-6-8-10-2-4
7-9-1-3-5-8-10-2-4-6
9-1-3-5-7-10-2-4-6-8

DIP SWITCH POSITION 5 (Boiler ON then High Flame – MANUAL 1 2 3 4 5 6 7 8 9 10)

Volts	3.6V	4.2V	4.8V	5.4V	6.0V	6.6V	7.2V	7.8V	8.4V	9.0V	9.6V
Boiler 1	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Boiler 2	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON
Boiler 3	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
Boiler 4	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
Boiler 5	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
Boiler 6	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON
Boiler 7	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON
Boiler 8	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
Boiler 9	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
Boiler 10	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON

DIP SWITCH POSITION 6 (MANUAL LOW HIGH)

Volts	3.6V	4.2V	4.8V	5.4V	6.0V	6.6V	7.2V	7.8V	8.4V	9.0V	9.6V
Boiler 1	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Boiler 1 High	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON
Boiler 2	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
Boiler 2 High	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
Boiler 3	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
Boiler 3 High	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON
Boiler 4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON
Boiler 4 High	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
Boiler 5	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
Boiler 5 High	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON

DIP SWITCH POSITION 7 (MANUAL LOW LOW)

Volts	3.6V	4.2V	4.8V	5.4V	6.0V	6.6V	7.2V	7.8V	8.4V	9.0V	9.6V
Boiler 1	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Boiler 1 High	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON
Boiler 2	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON
Boiler 2 High	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON
Boiler 3	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
Boiler 3 High	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
Boiler 4	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON
Boiler 4 High	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
Boiler 5	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON
Boiler 5 High	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON

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.

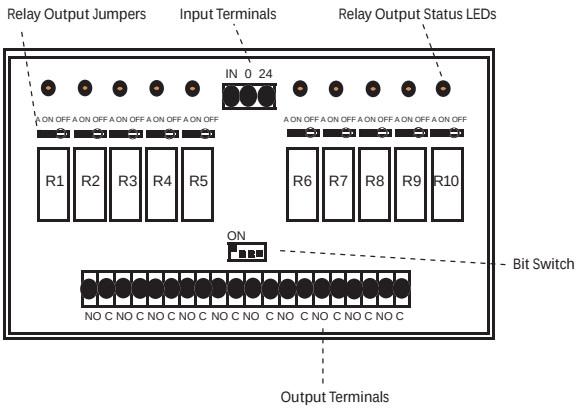
D) Connect the MOD 4 QRM to the controllers output as shown.

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.

CONNECTIONS



MODE SWITCH ACTION

AUTO SEQUENCE 12345678910

AUTO SEQUENCE LOW HIGH

AUTO SEQUENCE LOW LOW

AUTO SEQUENCE LOW HIGH LOW LOW

MANUAL SEQUENCE 1235678910

MANUAL SEQUENCE LOW HIGH

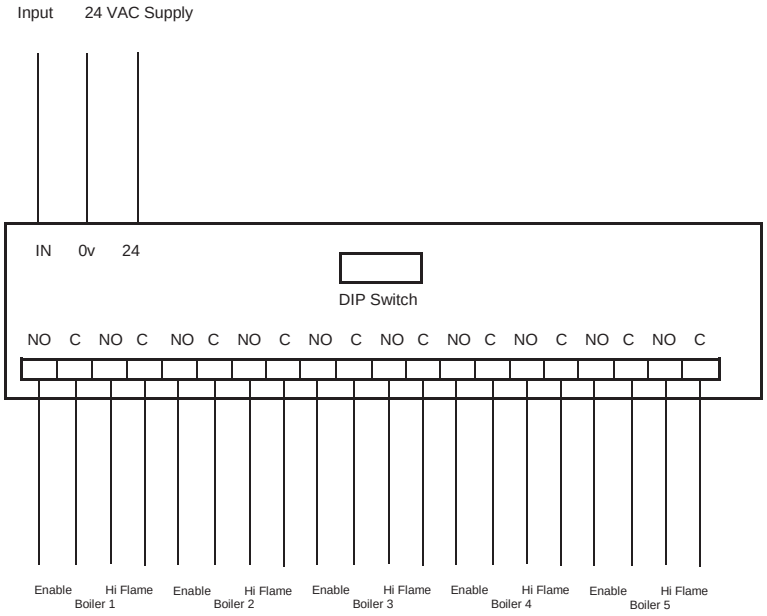
MANUAL SEQUENCE LOW LOW

Wiring Diagram

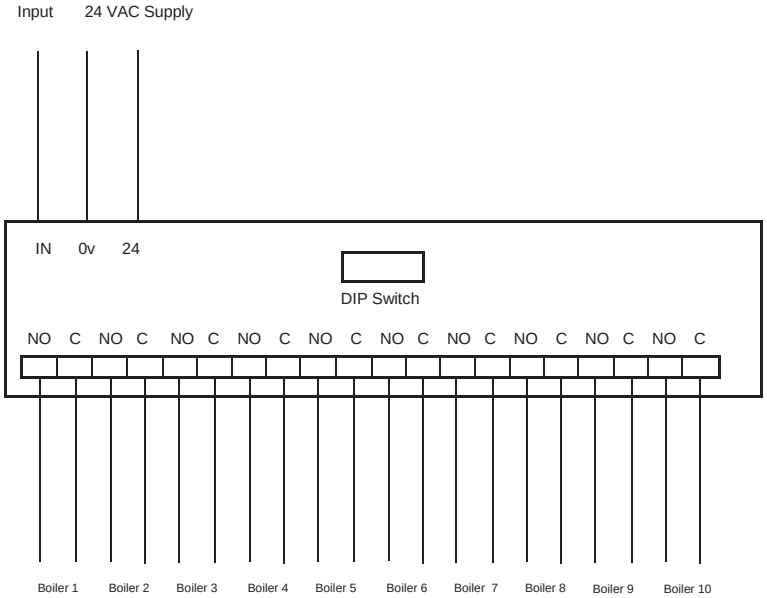
Caution

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

WIRING DIAGRAM FOR DIP SWITCH POSITIONS 2/3/4/6/7



WIRING DIAGRAM FOR DIP SWITCH POSITIONS 1/5



Notes: In the view of a constant development of their products, the manufacturer reserves the right for changing technical data and features without prior notice. The consumer is guaranteed against any lack of conformity for 24 months from the time of delivery, according to the European Directive 1999/44/EC. The full text of guarantee is available on request from the seller.