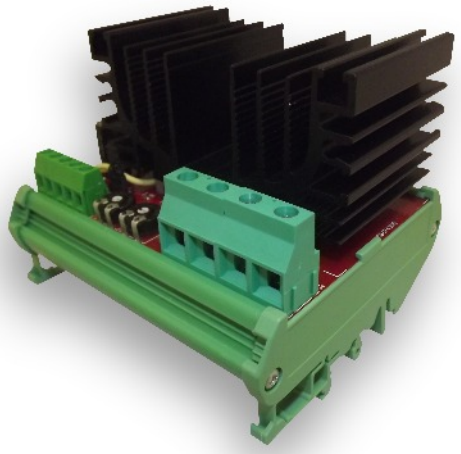
AX-MPR1-xx

4kW, 6kW and 9kW Single Phase Power Regulators



Product overview

The AX-MPR1 Series of DIN Rail mounting Power Regulators (thyristors) provide continuously adjustable control of electric heating loads from a BMS Controller or similar. Applications include electric heating coils, heating cables and electric furnaces. The AX-MPR1 Series use solid-state switching with “zero crossing technology” for minimum RFI and provide accurate switching control. All Power Controllers in this series feature Over Temperature Protection with automatic reset and Alarm Output, and LED Indication of output operation. No additional heatsinks are needed. The module enclosures clip on to TS35 section DIN Rail.

Features

- 0-10Vdc Control Input
- Burst-fire Control
- Auto-Reset Over-Temperature Protection
- 24Vac/dc Powered
- Neutral Pass Through Terminals
- LED Indication of operation

General specifications

Input:		0-10Vdc at 0.2mA maximum
Power Supply:		24Vac/dc ±10%
Power Consumption:		30mA @ 24Vdc (0.72VA) or 50mA @ 24Vac (1.2VA)
Alarm Output:		24Vac/dc (as power supply) - open-circuit when over temperature alarm is active
Max. Heater Duty:		See detailed table on Page 2
Rated Load:		See detailed table on Page 2
Rated Supply:		220-255Vac / 50-60Hz
LED Indication:		ON when output is on
Control isolation:		3,000V
Dissipated Heat:		See detailed table on Page 2
Terminals:	Control	Rising clamp for 0.5-1.5mm² cable
	Power	See detailed table on Page 2
Ambient Temp. Range:	AX-MPR1-4 AX-MPR1-6	0 to 55˚C Note; The units are rated at 40˚C. If using at higher ambient temperature de-rate the units by 10% for every 5˚C above 40˚C.
	AX-MPR1-9	0 to 55˚C Note; the units are rated at 30˚C. If using at higher ambient temperature de-rate the units by 10% for every 5˚C above 30˚C.
Over temperature:		Load is disconnected when heatsink temperature exceeds 90˚C
		Load is reconnected when heatsink temperature falls below 85˚C
Dimensions and weight:		See detailed table on Page 2
Country of Origin:		United Kingdom

Order codes

AX-MPR1-4	4kW Single Phase Power Regulator
AX-MPR1-6	6kW Single Phase Power Regulator
AX-MPR1-9	9kW Single Phase Power Regulator

Order Online at:
www.annicom.com
Email orders and enquiries to:
Sales@annicom.com

Detailed specifications

Part Number	Nominal Heater Duty	Maximum Load @40˚C	Maximum Dissipated Heat	Power Terminal Wire cross section	Dimensions WxHxD	Weight
AX-MPR1-4	4 kW	17.4 A	22 W	0.5-4mm² stranded or 0.5-6mm² solid core	101 x 95 x 90 mm	250g
AX-MPR1-6	6 kW	26 A	34 W	0.5-4mm² stranded or 0.5-6mm² solid core	127 x 95 x 90 mm	400g
AX-MPR1-9	9 kW	39 A	63 W	0.5-16mm² solid or stranded	140 x 95 x 105 mm	500g

Operation

The AX-MPR1 series control electric heating loads in linear proportion to the applied 0-10Vdc control signal. Solid-state semiconductor devices switch the load using burst-fire control, combined with zero-crossing point switching which virtually eliminates RFI emissions. Bust-fire control is where the ac load is switched fully on for an integer number of complete half cycles in a burst. Assume a cycle time of 4 seconds: With a 0-10Vdc Input Signal of 10V the load will be on all of the time i.e. fully ON. At 5V input the load will be switched ON for 2 seconds and OFF for 2 seconds, i.e. on average the load is at 50% power. At 2.5V input the load will be switched ON for 1 second and OFF for 3 seconds, i.e. on average the load is at 25% power. Note that whenever the load is switched ON, full load current will be drawn for that period of control time.

Installation and configuration

The AX-MPR1-x series Power Regulators mount on a TS35 Section DIN Rail and must be installed with their heatsink cooling fins in a vertical plane. (Refer to connection diagrams). Allow a minimum of 100mm between units mounted in a vertical plane.

CAUTION!

In normal operation the heatsink surface can exceed 90˚C. Dangerous potentials exist on the PCB and particular care should be taken.

Electrical Installation:

Installation must be carried out by a suitably trained electrician, and in accordance with the relevant statutory regulations in place.

Load Supply and Protection:

It is recommended that a suitably rated contactor is installed in the supply to the unit. The contactor coil should be interrupted by sensors for over temperature in the heater and also ideally upon air flow loss. Fuses or MCB's (miniature circuit breakers) are required to provide overload protection. High Speed Fuses will protect the solid-state switching devices against short circuit currents.

Maximum Heating Load:

The power rating of the units are given as a guide. The maximum current (which is dependant on the actual supply voltage and heating load) as shown in the specification table must not be exceeded.

Control Supply:

The control circuitry is fully isolated from the load supply and requires a 24Vac/dc supply. The control supply common is internally connected to the 0-10V Input Signal common.

Control Signal:

All low voltage signal and supply cables should be kept separate from high voltage or mains cables, separate trays or conduit should be used. Screened cable should be used for connections to BMS Controllers. Where possible the cable screen should be connected to a functional earth (not mains safety earth). The screen should be earthed at one end only to avoid earth loops.

Ventilation:

The ambient temperature of the installation should not exceed 55˚C. If necessary, enclosures or control panels should be ventilated with a cooling fan. See note in product specification for de-rating to be applied above ambient temperatures of 40˚C.

Cycle Time:

The Cycle Time is preset for 4 seconds. Adjustment is possible using the Cycle Time potentiometer, but is not normally required.

Signal Rescaling:

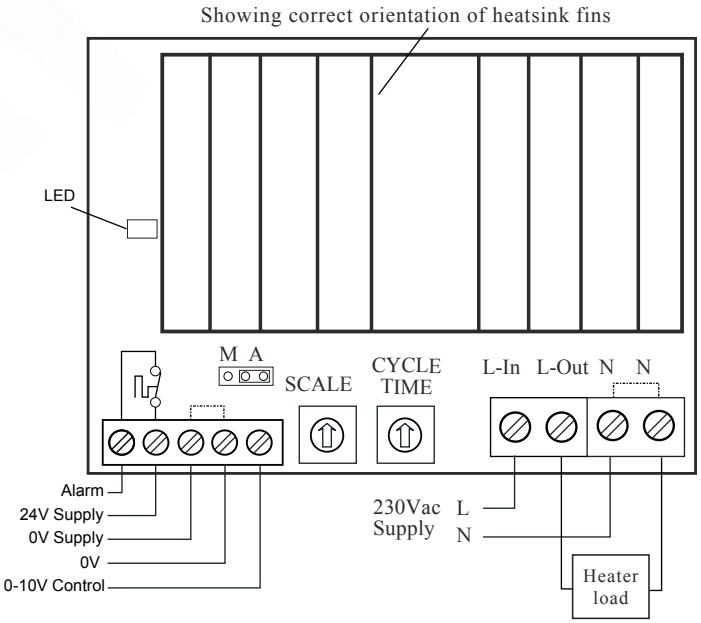
A 0-10Vdc Input Signal of 5V equates to the load being 50% ON. At 2.5V input the load will be 25% ON. At 10V input the load will be 100% i.e. full ON. Scaling adjustment is possible using the Scale potentiometer, but is not normally required.

Manual Override:
These modules are supplied preset to the Auto position. It is possible to manually override the input signal by placing the M/A Jumper in the M position. In this position the load will be 100% ON. The output load can be adjusted downwards using the signal rescaling facility. (See above).

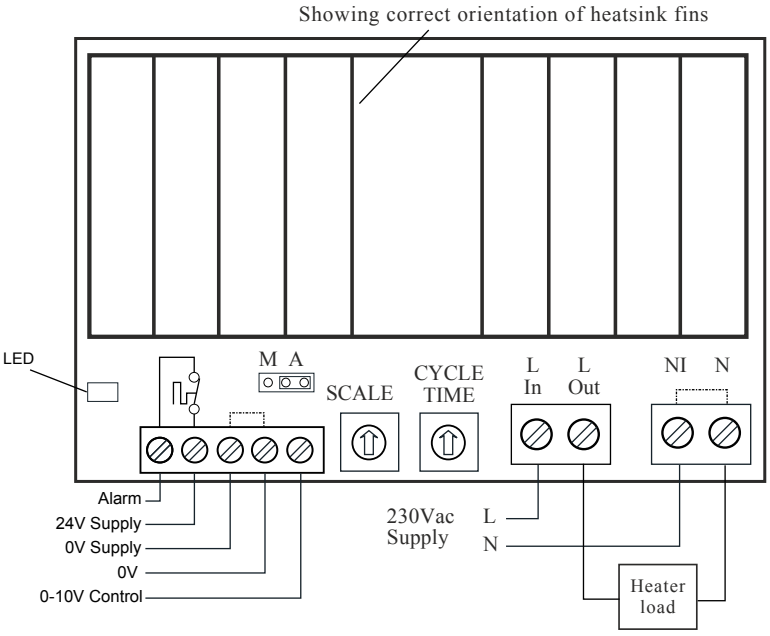
Over Temperature Monitoring:
An electronic thermal cutout is fitted to the heatsink to protect against over temperature. The AX-MPR1-x series will switch off the load if the heatsink temperature exceeds approximately 90˚C and will reconnect the load once the heatsink temperature has dropped below 85˚C. The alarm output will also change state. Under normal operating conditions the heatsink temperature will not reach 90˚C but this might occur, for example, if the ambient temperature exceeds 40˚C (AX-MPR1-9 = 30˚C).

Connections

AX-MPR1-4



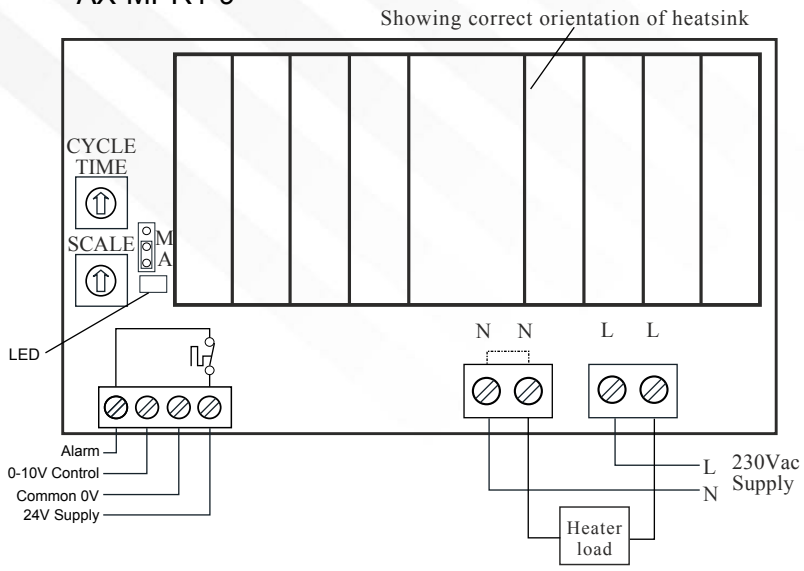
AX-MPR1-6



Terminals N-in & N-out are connected internally. Neutral may be connected directly to heater if permitted by local regulations. The AX-MPR1 Series are fully isolated and do not require a separate earth conductor.

It is imperative that the power connections are fully tightened, without excessive force, and ensure the maximum area of cable is in contact with the terminals.

AX-MPR1-9



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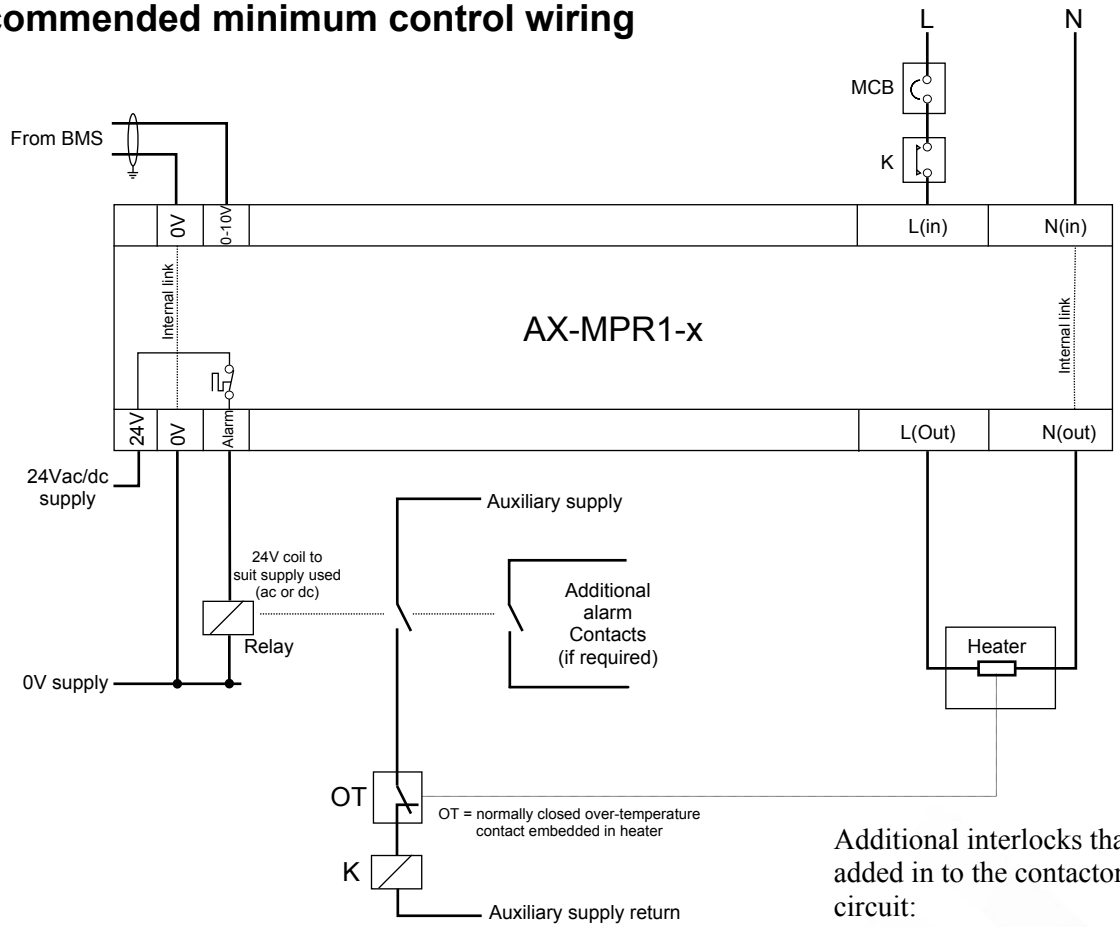
Recommended minimum control wiring



Additional interlocks that could be added in to the contactor (K) coil circuit:

Emergency stop signal
Fire signal
Start/Stop from BMS
Air flow switch