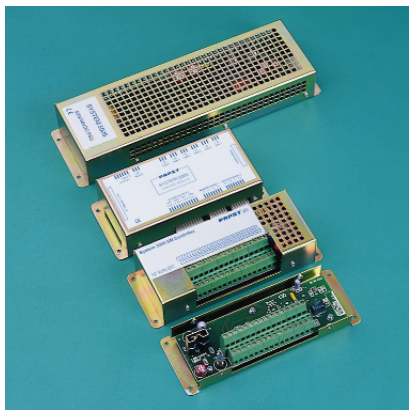
thermal management systems



system 3000 control module

Description

The System 3000 is a comprehensive solution for the control and monitoring of PAPST DC fans, together providing a thermal management system for electronic equipment. It offers a modular approach enabling the Control Module to function as a separate fan speed controller or as a complete system integrated with the Monitor Module.

Speed Control

Temperature dependent speed control is provided for any number of PAPST DC fans or blowers up to a total power capacity of 65W. The control module makes use of up to 4 thermistors which can be located in the most heat sensitive areas within the equipment. The module provides linear control between half and full speed. This is achieved by utilising one of the four user selected temperature programs available which sets temperature parameters T_1 (lower level) and T_2 (upper level). As the surrounding ambient temperature rises, the module responds to the highest temperature recorded by any one of the thermistors. In the event of a thermistor failure, the fans will run at full speed for fail safe operation. A shutdown and stand-by mode for low temperatures (T_0) is also available which is particularly useful for equipment exposed to very cold ambient temperatures outdoors.

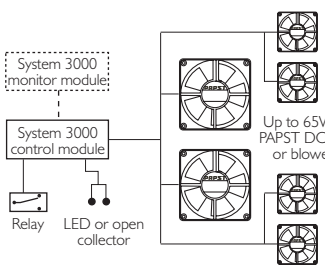
Alarm Functions and Outputs

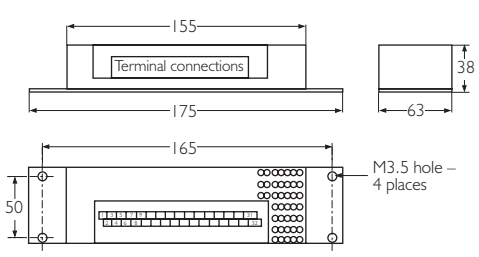
In the event of the measured temperature exceeding the upper selected level T_2, a dual output alarm is activated, one output in the form of a single pole change-over relay with volt-free contacts and the other as an open collector. The same dual alarm arrangement is provided in the event of a thermistor failure. An open collector output is also provided should the module switch to shutdown/ standby mode.

Features

The System 3000 Module offers advanced control for thermal management systems providing:

- Temperature dependant speed control
- Multiple point temperature sensing
- Can control any number of fans or blowers up to 65W total power consumption
- Modules available for 12, 24 or 48VDC PAPST fans
- Alarm outputs for over temperature and thermistor fail
- Low temperature fan shutdown/ standby mode
- Fail safe operation for thermistor fail
- Operates as a stand-alone controller or can be combined with System 3000 Monitor Module.
- All I/O connections are via screw terminals
- Protection: reverse polarity and power limiting on 5V supply
- Operating temperature range: 0 - 70°C
- EMC compliance to EN50081-1:1992; EN61000-4-3:1996 & EN61000-4-2:1995.





Alarm outputs

Ordering Information

Part No.	Description
S3000-C12	PAPST System 3000 Switch Mode Control Module 12VDC
S3000-C24	PAPST System 3000 Switch Mode Control Module 24VDC
S3000-C48	PAPST System 3000 Switch Mode Control Module 48VDC

All measurements in mm.

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system 3000 monitor module

Description

The system 3000 is a comprehensive solution for the control and monitoring of PAPST DC fans, together providing a thermal management system for electronic equipment. It offers a modular approach enabling the Monitor Module to function as a separate monitoring unit or as a complete system integrated with the Control Module.

Fan Monitoring

The unit provides 'fan failing' monitoring for up to 6 PAPST DC fans or blowers fitted with open collector (/2) or TTL (/12) sense wires. If the speed of any fan falls below one of the user selectable thresholds an alarm will be triggered.

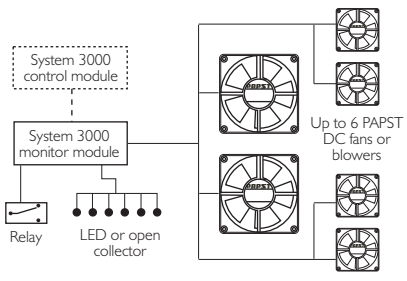
Alarm Functions and Outputs

One set of single pole change-over volt-free contacts provide an alarm indication should any fan fall below the selected speed threshold. Each of the six fans has a corresponding open collector alarm output. Each output will become independently active if the speed of its related fan falls below the selected threshold. These outputs can be used to drive LED's if required in conjunction with the 5VDC integral logic supply.

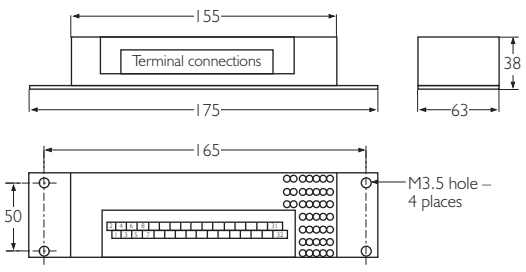
Features

The System 3000 Monitor Module offers advanced monitoring for thermal management systems providing:

- Monitoring for up to 6 PAPST DC fans or blowers
- Alarm outputs for direct or remote fan status
- Individual fan alarm output
- Supports 12, 24 or 48VDC PAPST fans
- Several fan fail threshold settings available
- Easy to integrate and connect to equipment
- Operates as a stand-alone monitor or can be combined with System 3000 Control Module.
- All I/O connections are via screw terminals
- Protection: reverse polarity and power limiting on 5V supply
- Operating temperature range 0 to 70°C
- EMC compliance to EN50081-1:1992; EN61000-4-3:1996 & EN61000-4-2:1995



Alarm outputs



Ordering Information

Part No.	Description
S3000-M12	PAPST System 3000 Monitor Module 12VDC
S3000-M24-48	PAPST System 3000 Monitor Module 24-48VDC

All measurements in mm.

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system 5000 integrated control and monitoring

Description

The System 5000 has been developed with the critical thermal needs of the equipment designer in mind. It allows for maximum control of the thermal profile required by today's sophisticated electronic equipment while introducing an 'environmentally friendly' aspect to the design.

Speed Control

Temperature dependent speed control is provided for up to 6 PAPST DC fans or blowers with a combined power rating governed by the power module. The control module makes use of up to 8 thermistors which can be located remotely with the equipment in the areas deemed to be the most sensitive.

The control module can regulate the fan speed linearly between half and full speed. This is achieved by two customer defined temperature settings, T_1 (lower level) and T_2 (upper level). As the surrounding ambient temperature rises, the system reacts to the highest temperature recorded by any one of the thermistors. In the event of a thermistor failure, the system can be programmed to run fans at full speed for fail safe operation.

A shutdown and stand-by mode for low temperatures can also be programmed to a user defined setting T_0, particularly useful for equipment exposed to very cold ambient temperatures.

Fan speed is fully controlled and regulated by the functionality of the power module. If the input voltage fluctuates, for example due to power fail or charge mode in a battery backup system, the fans will continue to operate in their temperature controlled state.

Expandability

With additional programming, up to an extra 8 fans can be monitored (expansion module) or heater/chillers can be switched on within the customers' system (power switching module).

Fan Monitoring

The System 5000 can be used in conjunction with PAPST DC fans fitted with open collector (/2) or TTL (/12) sense wires for fan monitoring. The module will provide 'fan failing' monitoring for up to 6 PAPST DC fans or blowers. If the speed of any fan falls below a pre-programmed percentage of the nominal speed, an alarm is triggered.

Alarm Functions

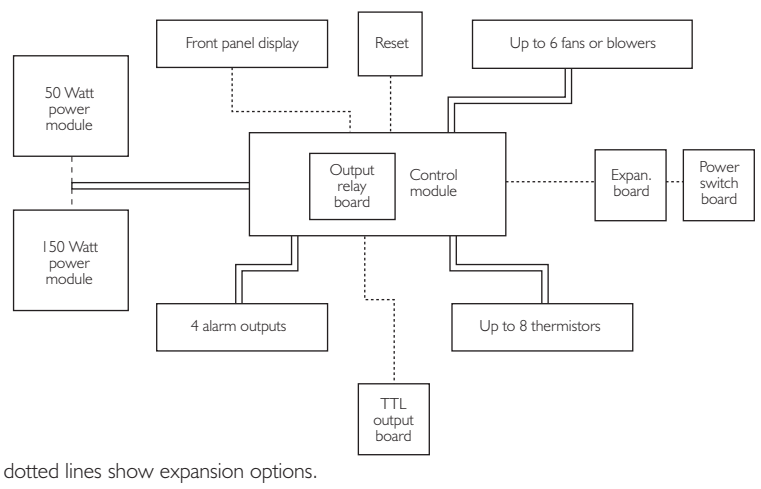
Four uncommitted alarm outputs are available. Typical configurations include:

I. Upper temperature T_2 reached
II. Over temperature alarm T_3 should the ambient temperature continue to rise above T_2
III. Fan failing
IV. Thermistor fail

Features

The System 5000 offers a modular approach to environmental control providing:

- Temperature dependant speed control
- Multiple point temperature sensing
- Regulated output allowing independent control of fan speed over a wide input voltage
- Fan fail monitoring
- Fully programmable functionality
- Fail safe operation
- Four uncommitted alarm outputs that can be assigned to suit customer requirements
- Variety of expansion modules for additional functionality
- Individually programmed to customer requirements.



Note dotted lines show expansion options.

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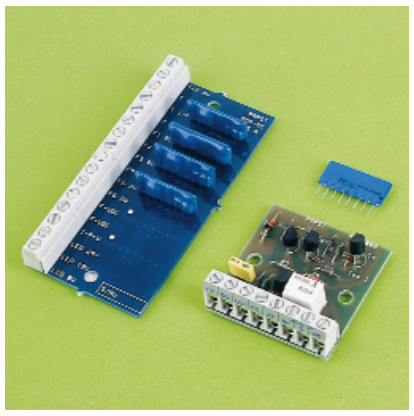
PFM 1250 monitor circuit



Description

The PFM 1250 is designed to monitor performance of one 12 or 24VDC PAPST fan.

The fan speed is monitored by the continual checking of the current commutation pulses. As the fan speed reduces, indicating that some external obstruction is affecting the fans performance, a fan fail indication is triggered via an LED output.

This is a non-latching output signal and as soon as the fan speed returns to normal the LED signal switches off.

Mounting is via a 8 pin card frame on 0.1 inch centres, and the PFM 1250 can be mounted directly onto a customer's own pcb, (where only one fan is being monitored), or onto the PCM 1000 as a component part of a system to monitor from 2 to 6 PAPST fans.

Physical dimensions

Hybrid 23mm x 20mm
Pin length 10mm

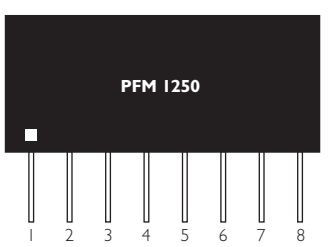
When assembling the PFM 1250 into the PMB SO (motherboard) for multiple fan monitoring, the white spot on the chip (Pin 1) should be aligned with the white spot on the board.

Features

- Versions available for all 12 and 24VDC fans
- Monitors current communication pulses
- Can be used with PCM1000 to monitor 2 to 6 fans
- Compact design which can be mounted on customer pcb.

Pin Connection Details

1. Indicated by white spot.
   0 Volts - supply
2. Fan 0 Volt
3. Fan supply, + voltage supply
4. Fan fail point selector
5. Fan fail point selector
6. 24V LED output
7. 12V LED output
8. 0V LED



Note this product line is currently being expanded. Please contact the PAPST plc Technical Department for the latest information and application advice.

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PCM 1000 monitor module

Description

The PCM 1000 carries the PFM 1250 Monitor chips which monitor the operating speed of the fan and indicates when a fan slows such that its speed falls below a predetermined level.

All PAPST 12 and 24VDC fans can be utilised with this modular interface system. Up to 6 fans can be monitored, the number being dictated by the number of monitor circuits assembled onto the circuit board.

Two different fan fail points (% of full speed) are available as standard on the board.

The interface with the rest of the Thermal Management System is through a terminal strip, making assembly simple and quick.

Physical dimensions are 80mm x 35mm x 12mm.

Available Options

With a minor change to the circuit board it is possible to use up to 3 NTC resistors, which, when connected to PAPST Variofans, provide monitoring of temperature controlled fans.

Features

- Suitable for all 12 and 24VDC fans
- Up to 6 fans per module
- Zoned fan assemblies can be controlled
- Choice of fan fail points (% of full speed)
- Compact construction.

Pin Connection Details

1. 0 VDC from Power Supply
2. } Sensor input – PAPST VARIOFANS 1, 2 & 3
3. } Sensor input – PAPST VARIOFANS 4, 5 & 6
4. } Spare sensor input
5. Fan 1-0VDC (Black wire)
6. Fan 2-0VDC (Black wire)
7. Fan 3-0VDC (Black wire)
8. Fan 4-0VDC (Black wire)
9. Fan 5-0VDC (Black wire)
10. Fan 6-0VDC (Black wire)
11. } +VE from PSU (Red wire)
12. } +VE supply to Fans 1, 2 & 3 (Red wires)
13. } +VE supply to Fans 4, 5 & 6 (Red wires)
14. 24V output to LED
15. 12V output to LED
16. 0V output to LED

N.B. Either pin 14 or 15 is used depending on the system configuration.

PCM 2000 output board

Description

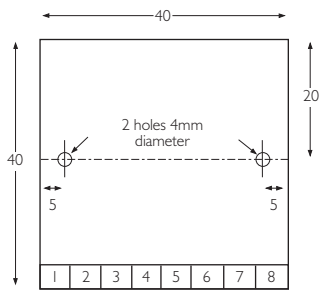
The PCM 1000 provides an output which illuminates a LED to indicate fan failure. By combining both the PCM 1000 and 2000 several other options are available. These include LED off at fan failure, TTL output which goes from high to low in a fault condition, and relay outputs in normally open/common/ normally closed variations. (The relay energises in fault mode.)

Features

- Input 12 or 24VDC from PCM 1000
- Input connections via PCB mounted terminal strip with wire protection
- Dimensions 40mm x 40mm
- Mounting by 2 M4 holes on circuit board.

Pin Connection Details

PIN1	(+VE)	12/24VDC input
PIN2	(SIG)	Signal input from PCM 1000
PIN3	(LED)	LED Output, (LED on – no fault condition)
PIN4	(TTL)	TTL Output, High – (no fault condition)
PIN5	(0V)	0 Volts
PIN6	(NC)	Relay normally closed
PIN7	(C)	Relay common
PIN8	(NO)	Relay normally open
Relay Ratings		1 amp @ 24VDC 0.5 amps @ 120VAC (Relay energises in fault condition).



Terminal Strip Connections

All measurements in mm.

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compact power supply – PPS603

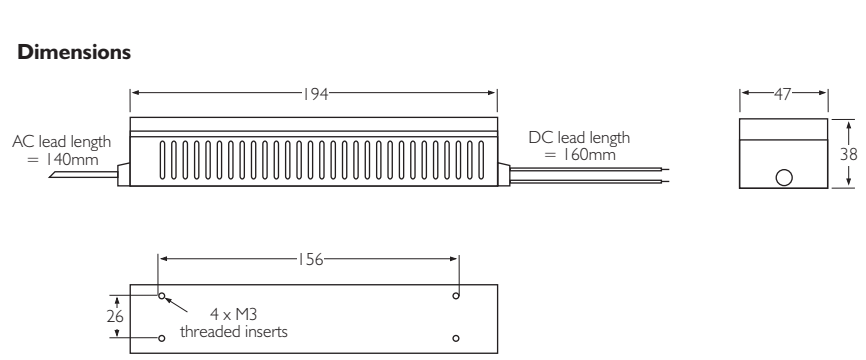
Description

The PPS603 is a compact switched mode power supply designed for use with PAPST fan products and Thermal Management Systems. It fits within a 1U high standard 19" fan tray.

It is a complete packaged unit which provides a regulated 12VDC output from any AC input between 90 and 260VAC, allowing it to be used anywhere in the world without voltage selection or switching.

Specification		
AC Input	Voltage	90 - 260VAC
	Frequency	47 - 63Hz
	Input line fuse	2A @ 250V
DC Output	Voltage	12VDC
	Minimum load	0.5A
	Maximum load	2.5A
	Peak load	3.0A
Temperature	Operating range	0 - 50°C
	Storage temperature	-20 - +80°C
	Relative humidity	20 - 80%
Protection	Over current production	
	Output protected against short circuit	
	Overload protection	
Approvals	Safety	EN60950 (1992)
	EMC	EN55022 (1994) Class B

Dimensions



All measurements in mm.

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