

# Dynasafe

## CONTROL SYSTEM FOR FUME CUPBOARDS

A compact electronic module which makes compliance with the Australian Standards' exacting conditions simple, safe and cost effective.

The "Dynasafe" Control System and pressure sensor (protected by Patent App.) is a compact electronic module containing all switches and timers to enable a fume cupboard to comply with Australian Standards numbers 2243-8-1986, 3000-1986, 2430-3-1987 Appendix 'A' and 1482-1985 and therefore be classified as non-hazardous.

This in turn allows the use of flammable liquids and gases to be used together with bunsen burners and other non fire proof electrical equipment such as hot plates, etc.



# CLASSIFICATION OF HAZARDOUS AREAS

The implicit requirements of the Australian Safety Standards which enable a fume cupboard to be classified as non-hazardous, are not widely known or understood.

'The classification 'fume cupboard and laboratories where flammable solvents are used' shall include any fume cupboard in which flammable liquids or gases are used.'

Definition as per AS2430:3-1987

If a fume cupboard does not comply with AS2430-3 1987 Appendix A then the interior is classified as a Zone 1 hazardous area and the entire outside of the fume cupboard within 0.6m in all directions from the opening and extending down to floor level is classified as a Zone 2 Hazardous area. However, the outside area vertically upward from the top of the opening into a fume cupboard is classified as non-hazardous. This allows sealed light fittings and switches to be fitted at high level, on fume cupboards.

However, what is not commonly understood is that if flammable liquids and gases are to be used within a fume cupboard that does not comply with Appendix 'A' of AS2430-3-1987 (and almost all fume cupboards have flammable liquids used within the work area at some time or another) then an operator cannot use any apparatus which is an ignition source in that fume cupboard. Bunsen burners, hot plates and most electrical apparatus unless they have a 'flame proof' classification, which is highly unlikely, therefore cannot be used in these fume cupboards.

One cannot by-pass the Safety Standards by merely fitting general purpose electrical outlets 0.6m from the opening, or above the opening of the fume cupboard i.e. in the Non-Hazardous Areas, if it is intended that an operator should use these G.P.O.'s to run a lead either through the open face of the fume cupboard or through any purpose made port in the side of the fume cupboard to provide a supply to a non fire proof apparatus used within the work area.

The work area is classified as a "Zone 1 hazardous Area" and unless the apparatus including any extension lead complies with AS3000 9.4 "Equipment in Hazardous Areas" then it will contravene the Electrical Safety Standards. The fume cupboard whilst used in this fashion cannot be said to comply with AS2243-8-1986 Part 8 Fume Cupboards.

One must be aware of the following warning referred to in the Standards: Although the requirements of Appendix 'A' of AS2430-3-1987 could be expected to minimise any explosion hazard one must be aware that in the event of a spillage of flammable liquid, a fire hazard is reduced but not eliminated.

The prewiring of the electrical components of the fume cupboards are now more often the responsibility of the manufacturer while the incoming supply is left for the site electrician. This procedure ensures that the fume cupboard is wired under ideal workshop conditions, not by an electrician working in a cramped site condition, on a product with which he may not be conversant. It also clearly separates the line of responsibility should a fume cupboard not comply with the requirements of the electrical standards.

Failure of the specifying organisation to ensure compliance in detail could have serious consequences to human life, with associated personal legal liability.



# CONTROLS

Contained within the Dynasafe module are the following:

## Light

On and off switches are provided for the light with individual LED indicators and is complete with a relay to connect directly to the fume cupboard light fitting.

## Fan

On and off switches are provided for the fan with individual LED indicators and a 20 minute timer to allow the fume cupboard to be "post purged" when the "off" switch is activated. The "post purge" mode operation is also indicated by an LED. The panel includes a relay to connect to either a fan motor contactor or directly to a Syncroflow Controller.

## Remote Indicator

A further relay is provided for wiring directly to a *remote* "fan off" indicator (alarm or light) if desired.

## Syncroflow Switches

An "auto" switch with LED indicator which allows the patented Syncroflow Sash System (when fitted) to operate in its automatic mode.

A "boost" switch with a flashing LED indicator which when activated immediately provides the maximum available extraction rate.

Terminals and relay are provided for wiring direct to a Syncroflow controller.

## Spray Bar

An "auto" switch with LED indicator which allows the spray bar (usually fitted behind a back baffle) to automatically operate for the required 15 minute "post purge" when the fan is switched off. The "post purge" mode is indicated by a further LED indicator.

A "manual" switch is provided to allow an operator to activate the spray bar at any time, if he so desires.

Terminals and relay are provided for wiring to a water solenoid valve fitted in the supply to the spray bar.

## Pre Purge

Terminals and relay are provided for wiring directly to a gas solenoid valve to be fitted in any gas supply and to a 16 amp contactor fitted in the 240 volt power line to any power outlets on the fume cupboard.

When the fan is turned "on" a LED will indicate that the power/gas is "off" until the necessary one minute "pre purge" has been completed, after which a separate LED will indicate that the power/gas is "available".

## Post Purge

When the fan is turned "off", a LED will indicate that the fan is now in its necessary 20 minute "post purge" mode. Supplies to any power/gas will be immediately cut as indicated by a LED.

## Pump

Terminals and relay are provided for wiring direct to a fume scrubber recycle pump (if fitted).

LED indicators are provided to indicate when the pump is "off", in the necessary 15 minute "post purge" mode and when the pump is operating.

## Audio/Visual Alarm

Terminals and relay are provided for wiring from the Dynasafe Pressure Sensor, which is connected to the exhaust duct via a small flexible tube.

In the event of a large variation or extraction failure within the fume cupboard exhaust duct, the power and gas supplies will be automatically shut down, a 75 dB alarm within the module will be activated and two larger indicator lights will start flashing.

## Remote Warning

Also provided is a further relay for wiring direct to a *remote* alarm or lights if desired. This feature is ideal for indicating an extraction failure in situations where a *separate* alarm system is required, e.g. in a passage way or a security office.

## Alarm Mute

An "alarm mute" switch with a LED indicator is provided to turn off the alarm in the module. Activation of this switch will not turn off the flashing warning lights or any *remote* warning device. After alarm is muted power/gas will remain shut off until fault is corrected.

# CONTROLS

## Reset

This reset switch is used to manually reset the alarm system *after* any fault is rectified. One cannot reset the alarm system until the fault is rectified.

## Emergency Isolator

This emergency isolator required by the Standards, will, when activated, isolate electrical power to any power outlets fitted to the fume cupboard and any gas supply via a 240 volt contactor and solenoid valve installed in the gas supply line. Operation of this "emergency switch" does not interrupt the supply to the exhaust fan.

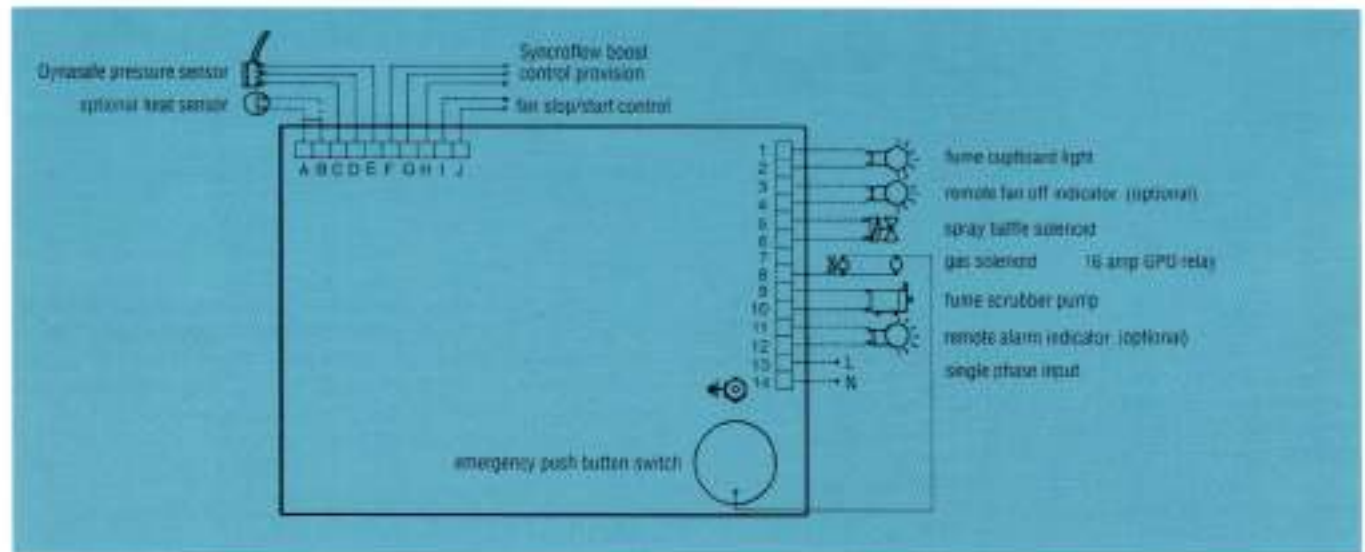
## Heat Sensor (optional)

Input terminals are provided within the Dynasafe module to provide wiring from a heat sensor fitted inside the fume cupboard (if desired).

In the event of overheating within the fume cupboard chamber, the heat sensor circuit will provide for shutting down supplies and activating the alarm system (the same way as with an extraction failure).

## Commissioning Programme

Concealed within the control circuit is a magnetic switch, accessible to maintenance staff only, which allows the inbuilt timers to be bypassed to enable commissioning, adjustments and rectification of any faults. Hence maintenance can be carried out without the delay of waiting until timers run out.



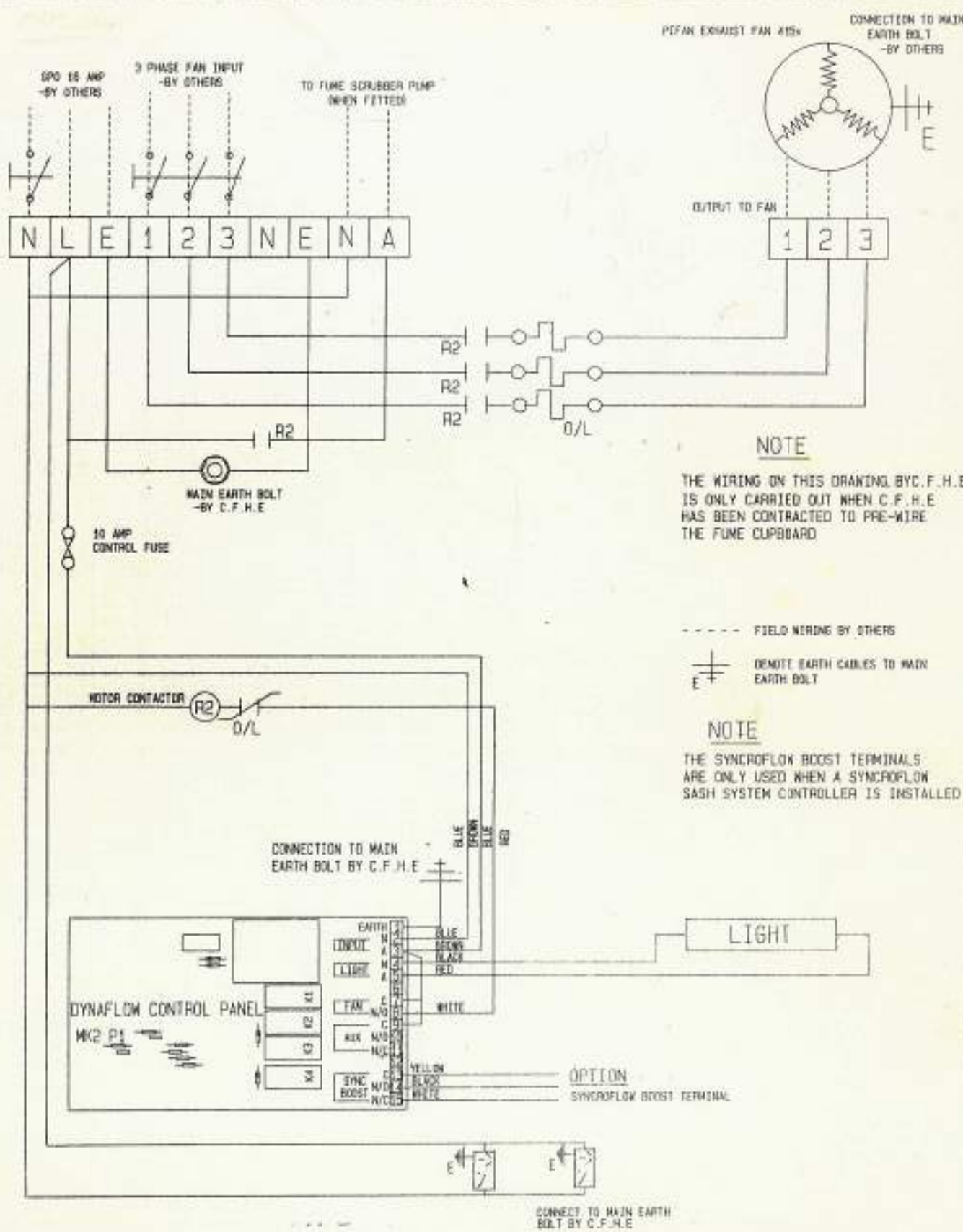
All of the above operating systems, switches, timers, relays, etc. are contained in the Dynasafe module measuring 191mm x 131mm x 70mm deep

The face of the panel is finished flush. All switches are of the touch design, except the mushroom headed emergency switch.



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**NOTE**

THE WIRING ON THIS DRAWING BY C.F.H.E. IS ONLY CARRIED OUT WHEN C.F.H.E. HAS BEEN CONTRACTED TO PRE-WIRE THE FUME CUPBOARD

----- FIELD WIRING BY OTHERS  
 ⚡ DENOTE EARTH CABLES TO MAIN EARTH BOLT

**NOTE**

THE SYNCROFLOW BOOST TERMINALS ARE ONLY USED WHEN A SYNCROFLOW SASH SYSTEM CONTROLLER IS INSTALLED

APPROVED FOR CONSTRUCTION

DATE: 12/6/91

<b>CHEMICAL FUME HANDLING EQUIPMENT</b> 28 MARAZAN ST. CROYDON 2015 PH: 089 1550 FAX: 089 1577				
DYNAFLOW FUME CUPBOARD WITH STANDARD 3 PHASE FAN & DYNAFLOW CONTROL PANEL WIRING DIAGRAM (PREWIRED ARRANGEMENT) WIRING DIAGRAM				
<b>DYNAFLOW &amp; FAN</b>				
Drawn: S.W.	Scale: ---	Rev: 1st	Job No: CF5009/3	Proj No: 3
Design: A.S.	Date: 18/3/90	13		
Checked: J.K.	Appd: ---			

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