

Microsave Twinfan Control System

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NOVEMBER 2000

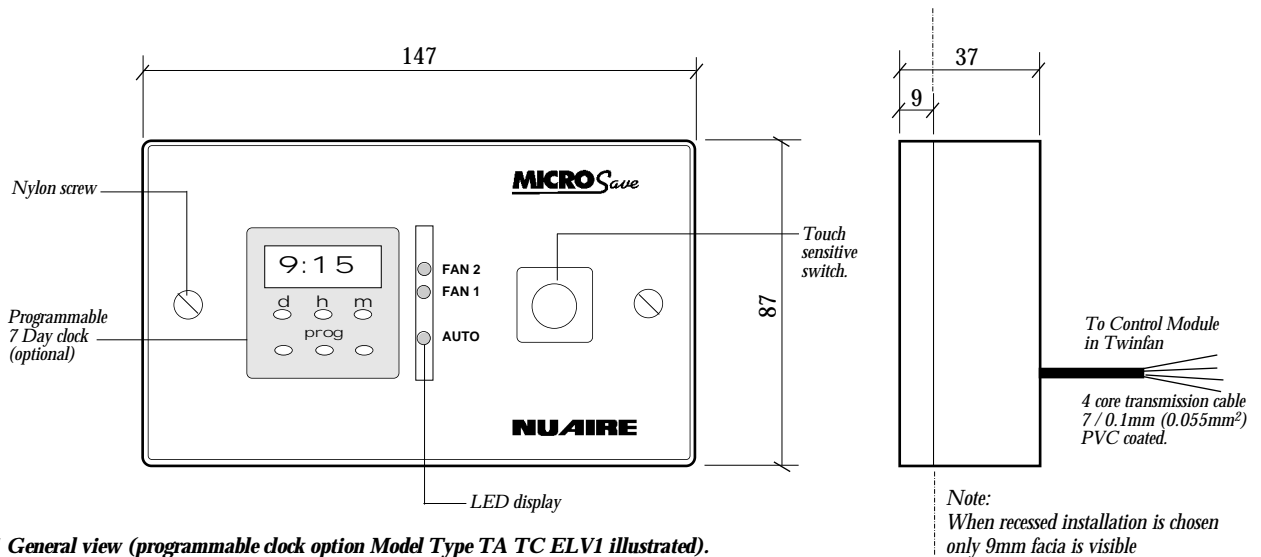


Fig. 1 General view (programmable clock option Model Type TA TC ELV1 illustrated).

Introduction

The Microsave Twinfan Control System comprises two electronic modules connected via Safe Extra Low Voltage wiring. The Control Module is fitted in the Twinfan. The Interface Control Panel is mounted at the desired point of operation, (see fig. 2).

The system has been specifically designed for use with NuAire Twinfan extract units and utilises **Safe Extra Low Voltage circuitry (S.E.L.V.)** to control and display the operation of the NuAire Twinfan.

The Interface Control Panel (I.C.P.) can be fitted at any convenient location within the building, its compact size allowing an easy and unobtrusive installation, (see fig 1).

All Microsave Control Systems include automatic changeover from running fan to standby fan in the event of fan failure. In addition, the following options are available:-

Manual Duty Share -

Manual override for fan selection.

Auto Duty Share -

Fans changeover automatically every 12 hours.

On/Off Function -

Interface Control Panel incorporates on/off facility.

Run on Timer -

Allows fans to run via remote switch for preset period.

Time Clock Control -

Time Clock will control fan function through 7 day Time Clock.

Varitrol -

Dual volume for high/low building occupancy settings (day & night).

B.M.S. compatible

Microsave BMS interfaces with Building Management Systems to offer full fan control and system status.

The NuAire Microsave Twinfan Control System conforms to
EN 50081-1 (1992) EMC Standard (Emissions)
and **EN 50082-1 (1992) EMC Standard (Immunity)**.

Contents

	Page
Introduction	1
Control Options	2
Coding	2
Installation - in Series 3	2
- in Direct Drive units	3
- in Belt Drive units	3
The Interface Control Panel (I.C.P.)	4
Clock Options	4
BMS Option	5
Wiring Diagrams	6

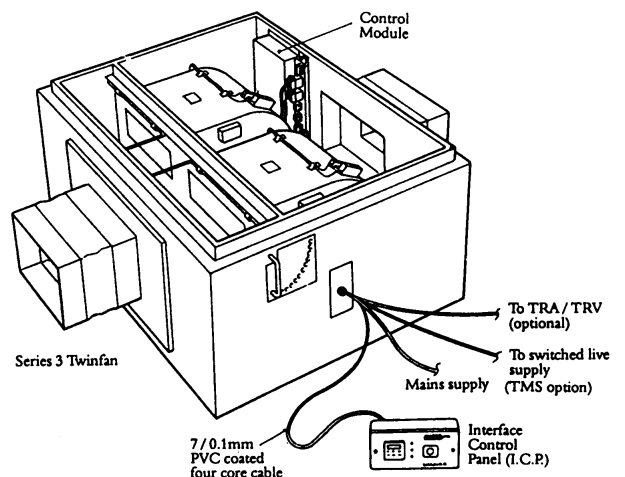


Fig. 2. Microsave Control System as installed in NuAire Series3 unit showing location of Control Module

Control Options

TM

This provides manual selection of either fan for duty sharing or test purposes using the touch sensitive fan selector switch.

TMX

Similar to the TM control unit, the TMX has an additional 'off' position on the I.C.P.

TMS

Again similar to the TM control unit, the TMS unit has, in addition, an electronic timer. This model maintains the selected fan running for a period adjustable between 5 and 30 minutes approximately after the initialising source (a coupled light switch or similar) has been switched off. When the timer switches off the I.C.P. displays an amber light indicating that the controller is in its standby mode awaiting another switched signal.

TA

Provides automatic duty sharing facilities in addition to the auto changeover on fan failure. An electronic timer brings alternate fans into operation at 12 hourly intervals. This ensures optimum duty sharing, promoting maximum bearing life. In this mode the I.C.P. displays a green 'AUTO' light. Manual override is available to allow fan selection for test purposes.

TV

This is the NuAire VARITROL option which provides automatic duty sharing in addition to automatic changeover on fan failure. The Varitrol function enables both fans to be independently adjusted within the Twinfan at different duties to cater for periods of high/low occupancy (day or night). This control information can be programmed by an electronic programmable clock at the I.C.P. Up to 3 'on' and 'off' times can be set for a 24 hour period, 7 days a week. The 'off' programmed times may then be employed to operate Fan1 and the 'on' times to operate Fan 2.

ITA

The ITA control has the same operational function as the TA ; however, both the Control Module and the I.C.P. are located within the Twinfan. Fan failure can be reported remotely using a TRV ELV indicator.

CLOCK OPTIONS

TC (time clock)

A programmable clock can be specified to control all options other than when a Run on Timer (code 'S') or BMS is specified. The clock offers 3 'on' and 3 'off' programmable time periods during 24 hours , 7days a week.

REMOTE INDICATORS

TRA ELV

As a remote indicating extension of the TM and TA control options, the TRA ELV provides audible warning of a fault condition. The warning can be silenced by a manually operated muting switch, this lights an LED indicator which remains on as an indication that the audible warning has been switched off.

TRV ELV

Another remote indicating extension of the TM and TA controls is the TRV ELV which provides positive indication at a remote location of fan condition by means of 'Run and Fail' indicators.

Key to Coding

T	= Twinfan.
M	= Manual Duty Sharing.
A	= Automatic Duty Sharing.
ELV	= Extra Low.
1	= 1 Phase.
3	= 3 Phase.
BMS	= Building Management System.
S3	= Series 3 Twinfan.
DD	= Direct Drive.
BD	= Belt Drive.
RA	= Remote (audible).
RV	= Remote (visual).

Installation

Microsave in Series 3 units

(For Installation instructions of the Series 3 unit, refer to NuAire Leaflet No. 670435)

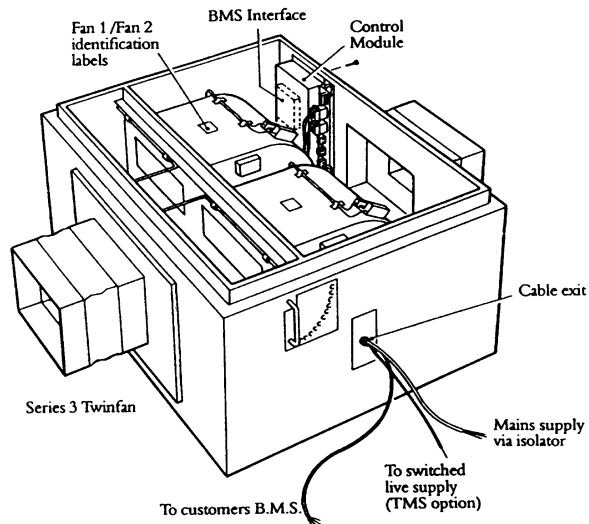


Fig. 3 B.M.S. Interface and Control Module located in Series 3 Twinfan

The Control Module is mounted on the vertical panel at the intake side of the unit (see Fig. 3). The Twinfan is supplied with the fans already plugged into the Control Module and with the module connected to its earth post. If, at any time, these connections are removed it is essential that they are replaced in the correct order i.e. Fan 1 connected to Fan 1 socket. Failure to do this will result in inaccurate status reporting to the I.C.P. or B.M.S. For convenience it may be necessary to detach the module from the sidewall by removing the two fixing screws on the outside of the unit. Figure 4 shows the Control Module and all the possible option connections.

Cables should be routed along the inside corners of the unit until finally passing through the cable exit point illustrated.

I.C.P. Connections

Using 4 core 7/0.1 (0.055mm²) PVC coated cable. Terminals 12 to 15 are used to transmit the Low Voltage signal between the I.C.P. and the module. The terminals are colour coded Yellow (YEL), Black (BK), Red (RED) and 'Blue' (BL) on both the Control Module and the I.C.P.

Remote run / Remote fail connections.

These are used in conjunction with TRA and TRV remote indicators to indicate a failure at a remote location.

Using 4 core 7/0.1 (0.055mm²) PVC coated cable a connection is made between terminals 8-11 on the Control Module and the TRA or TRV units. (See Fig. 15 & 16)

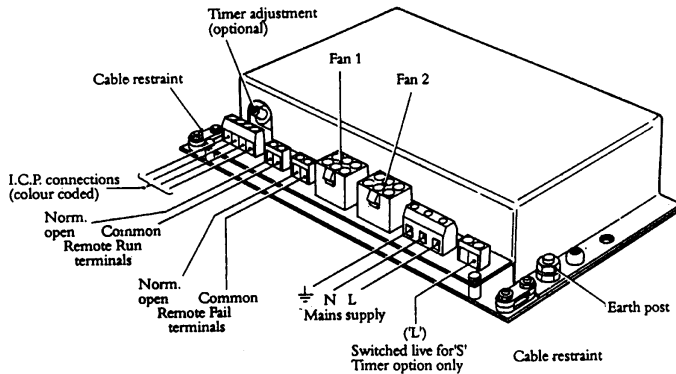


Fig. 4 Control Module Connections

Fan 1 / Fan 2 Connections

These must be correctly fitted so that the controller reports the correct information. The plugs fit together in only one orientation and must be pushed fully home until they lock in position. To remove the plug, slight pressure must be applied to release the tab.

Mains Supply Connections

Terminals 3, 4 & 5 are used for mains supply. On the Twinfan unit the supply must be fused and isolated by the user.

Timer Switched Live Terminal

This terminal is only used when a run-on timer is specified. The switched live (from the lightswitch, doorswitch or similar) is connected to the 'L' terminal and must also be isolated (by others). It is important that all wiring should be routed through the cable restraints provided, otherwise vibration from the unit will stress the wire connections. The connection to the I.C.P. and control function can be seen in figure 4.

B.M.S. Option on Series 3

When a BMS option is chosen both the control module and the B.M.S. Interface are located within the case. Connections between the circuits are already provided. It is only necessary to connect to the B.M.S. Interface, see BMS options (page 5) and also the supply to the Control Module.

Microsave in Direct Drive (DD) units

SINGLE PHASE ONLY

(For installation of the DD unit, refer to NuAire Leaflet No. 670021)

The Control Module is mounted on the vertical panel at the intake side of the unit (see fig. 5). The above comments are relevant to the DD unit and all wiring details are identical. See Electrical section for wiring details.

Again, when a B.M.S. option is chosen both the Control Module and the B.M.S. Interface are fitted within the unit case (see fig. 5).

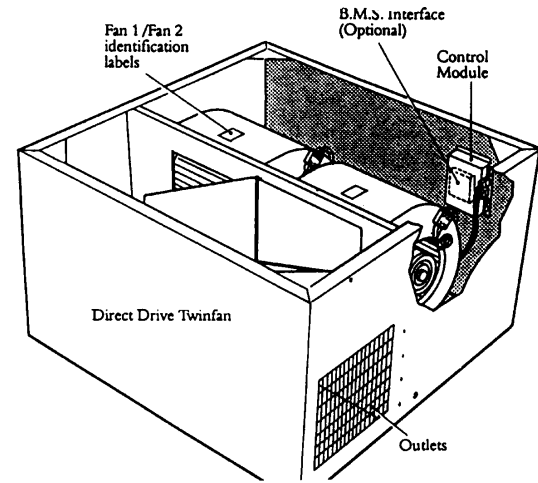


Fig. 5. Control Module location in DD Twinfans

Microsave in Belt Drive Twinfans

(For installation of the BD unit, refer to NuAire Leaflet No. 670021)

SINGLE PHASE

Details and wiring are as described for the Single Phase Direct Drive units.

THREE PHASE

The Control Module Assembly is situated within the case of the Twinfan. The exact position may vary depending on the spigot arrangement specified. Flexible conduit is used between the motor and Control Module Assembly inside the Twinfan. The Control Module Assembly has two compartments, one houses the electronic control module circuitry and the other contains the contactor and overload protectors. The control module circuitry is housed in its own metal box which is sealed. Any unauthorised entry will invalidate the guarantee. The contactor compartment has a metal cover which can be removed by releasing two screws and rotating the cover downwards. It is recommended that the complete control assembly is removed from the Twinfan sidewall during installation to facilitate easier wiring up of mains supply and the control option chosen. The control assembly is retained by three mounting screws located on the outside of the twinfan.

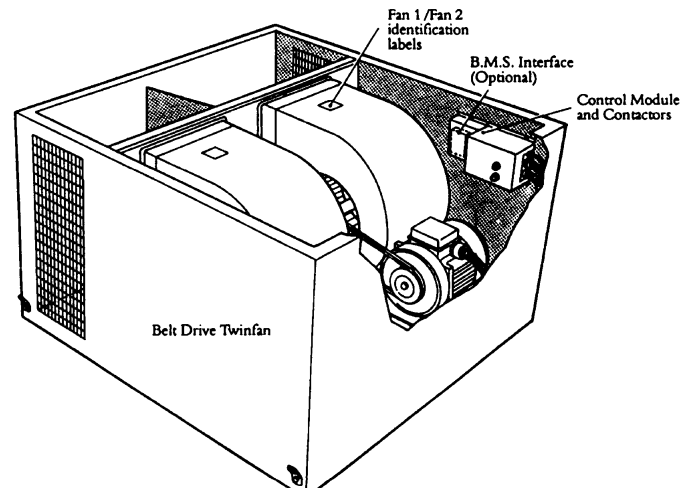


Fig. 6. Control Module location in Three Phase BD Twinfans

Microsave in Belt Drive Twinfans (continued)

The Control Module Assembly internals are prewired by NuAire. The customer will need to supply 3 phase power to the terminals indicated on the wiring diagram and connect the Extra Low Voltage wiring to the control module terminals to suit the control option chosen.

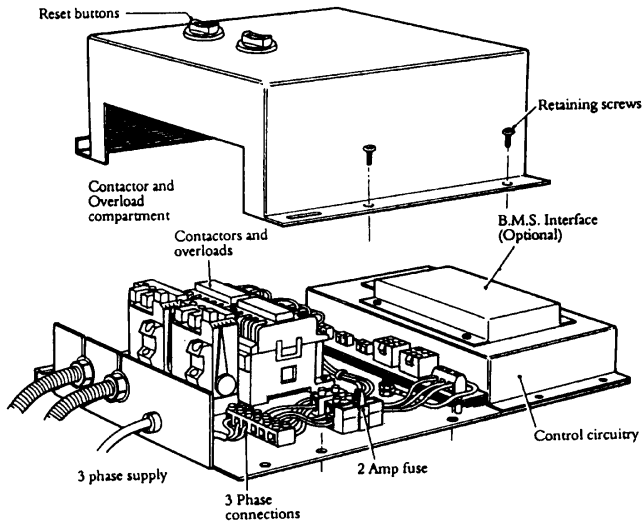


Fig. 7. Control Module and Contactor Details

The terminals for the control options are the same as previously described, (see fig. 4). All customer wiring must be routed through the cable restraints provided within the control assembly this is essential to avoid damage being caused by vibration. On completion of the wiring, the control assembly must be fixed into position inside the twinfan using the three mounting screws removed earlier.

NOTE: Refer to the wiring diagram for details of the isolator switch which must be fitted in the supply line to the twinfan in accordance with BS 3456. (See Fig. 12)

The Interface Control Panel (I.C.P.)

Description and use

The ICP is available with a number of display formats to suit the particular controller being used. A number of visual displays indicate the status of both the fans and the controller.

Fan Status

The status of both Fan1 and Fan2 is shown by two bi-colour LEDs (one for each fan). The LEDs illuminate GREEN if the fan is running and RED on fan failure.

Controller Status

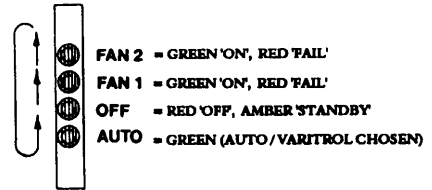
On the TMX controller an 'OFF' position is provided which illuminates a RED LED when 'OFF' is selected. When a run-on-timer is specified, the same LED illuminates AMBER when the circuit has 'timed out' and is awaiting a further signal. The controller is then in its 'STANDBY' mode.

The 'AUTO' LED must be selected to engage the automatic 12 hour duty share. The display would then be 'AUTO' (GREEN) and either Fan1 or Fan2 (GREEN). The same LED is used to engage the VARITROL option.

The VARITROL option controller is supplied with a programmable clock which governs the operation of the fans. Fan1 operates during the programmed 'OFF' times and Fan2 during the programmed 'ON' times. However, 'VARITROL' must be selected before this is possible. Care must be taken when this option is chosen in connecting the wiring to ensure that Fan1 on the Twinfan is connected to Fan1 on the Control Module etc, otherwise the individual Varitrol daily extract rates will be incorrectly programmed.

The I.C.P. is operated by touching the recessed button on the right of the fascia. The Controller will then sequence through its available options which are simultaneously displayed by the LEDs.

Clock Options Option Sequence



An operating booklet is supplied with the clock option. The booklet explains how to set and program the clock and understand the visual display.

NOTE: The clock has its own battery back up which will store programs for up to 72 hours.

When installing a clock option, check if the display is visible. If the display is not showing the battery will require charging for approximately 15 minutes. During this period there will be no display.

Assuming the display is now showing, the clock will now need to be reset to zero. This is achieved by pressing the four corner buttons simultaneously. The clock is now ready for use. Simply follow the instructions in the booklet to set the time and program. It is possible to program 3 'ON' and 3 'OFF' periods during one day, seven days a week.

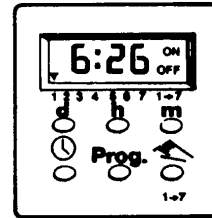


Fig. 8. Clock Display

How the Clock Control works

The Clock will set the operating periods for the Controller. During the programmed 'ON' periods the Controller will function according to its type i.e. TM, TA etc.

TM with Clock

When used with a TM Controller it is possible to manually select the required fan which is to run. When the Clock is 'ON' this fan will then be chosen.

TA with Clock

With this Control the Fans can be manually selected as above. However, if the 'AUTO' function is engaged a 12 hour counter will be initiated. During the programmed 'ON' time the counter will add the 'ON' times until the 12 hours are completed and then operate the Standby Fan.

Varitrol with Clock

With the Varitrol option each Fan is controlled by the 'ON' and 'OFF' status of the Clock. Programmed 'ON' times will control Fan 2 and programmed 'OFF' times control Fan 1. By adjusting the Varitrol damper on each fan, different extract rates can be employed at programmable times of the day.

To operate the damper, refer to the Installation literature for the particular Twinfan in use.

Note:

It is important to correctly identify Fan 1 and Fan 2 within the unit. All fan units are provided with identification labels on the scroll casing (see fig 3).

B.M.S. Option

With the TMX option previously mentioned it is possible to specify an additional circuit which allows the control to be connected to a B.M.S. or B.E.M.S. computer. When fitted this additional circuit is mounted on top of the Control Module and is called the B.M.S. Interface, (see fig.9a). The circuit (see Fig 10) has terminals on both ends of the board. One end is pre-wired by NuAire, the other end is wired by the customer when connecting the B.M.S. input and output channels. The cover can be easily removed to gain full access to the B.M.S. interface circuit. The terminals are colour coded as detailed in Fig 9b and Fig 10. The customer is required to wire into the B.M.S. terminals and also to supply power to the Control Module as shown in the wiring diagrams on page 6. For details on TMX BMS operation see page 8.

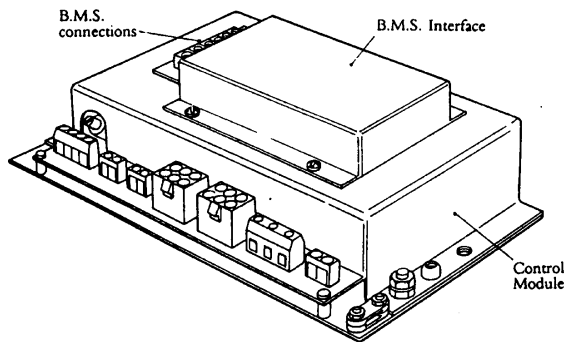


Fig. 9a Control Module with B.M.S. Interface fitted.

Whichever control option has been specified, the B.M.S. can monitor 3 channels which report on:

1. Fan 1 status.
2. Fan 2 status.
3. Controller status.

NOTE :

A fourth channel is provided to output a pulse from the B.M.S. to sequence the controller through its functions.

The controller requires a pulse of at least 7Volts for a duration of 10 mSec. minimum. This effectively reproduces the action of the touch sensitive switch in a 'normal' Microsave installation.

The B.M.S. Interface receives its power from the Control Module at 240V. An isolating transformer is included in the B.M.S. Interface to provide the necessary 24V for the circuit.

IMPORTANT NOTE:

As this B.M.S.circuit has high voltage connections care must be taken during its installation. In all installations including B.M.S. the black terminal must be connected to 'common'.

		BLACK	GREEN	WHITE	BLUE	YELLOW	RED
		0 Volts (Common)	Switched output from BMS to Controller to sequence fans	(if applicable) Controller status	Fan 2 Status	Fan 1 Status	(Optional) Supply 24 Volts
Voltage Reading	0 - 2.5V	-	-	OFF	OFF	OFF	-
	2.5 - 7.5V	-	-	-	RUN	RUN	-
	7.5 - 10V	-	-	-	FAIL	FAIL	-
Current Reading	0 - 8mA	-	-	OFF	OFF	OFF	-
	8 - 16mA	-	-	-	RUN	RUN	-
	16 - 20mA	-	-	-	FAIL	FAIL	-

Table 1. BMS Channel Coding

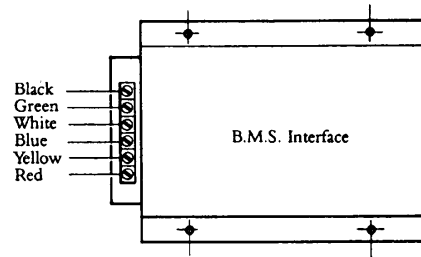


Fig. 9b B.M.S. Module connection terminals.

Further Options

External 24V supply

If necessary, the main B.M.S. computer can supply power to the interface circuit. However, to do this the link detailed in fig.10 must be cut. The 24V supply is then connected to the 'Red' terminal on the B.M.S.Interface. **NB. If an external supply is not required, 24V is present at the RED terminal. This can be switched to the GREEN terminal to provide the necessary pulse.**

Input from B.M.S.

The four channels can be adapted to give voltage or milliamp signals. Each channel has a 'link' on the BMS Interface circuit board which can be in either the 'open' or 'closed' position. If a Voltage signal is required the link for that channel should be 'closed'. If a current signal is required the link for that channel should be 'open'. **Unless otherwise specified all the channel 'links' are pre-set by NuAire 'open' to read in milliamps.** If it is desired to test the Controller or run the fans prior to installation of the B.M.S. system, the 'green' and 'red' terminals must be linked via a momentary switch. This will enable the controller to manually sequence through its operating cycle. A pulse of at least 7 volts for a minimum of 10mS is required to sequence the controller.

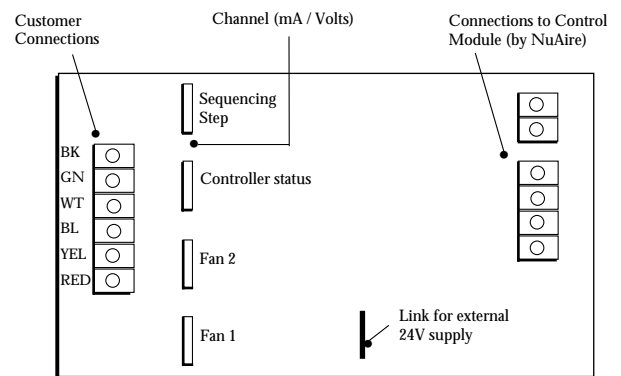


Fig. 10. Schematic B.M.S. Interface circuit layout showing links and B.M.S. terminals

NOTE:

It is possible to connect an appropriate I.C.P. to manually operate the equipment. This temporarily by-passes the B.M.S. Interface, for test purposes. Connection is the same as for a standard I.C.P. installation. (See Page 2)

Electrical WIRING DIAGRAMS

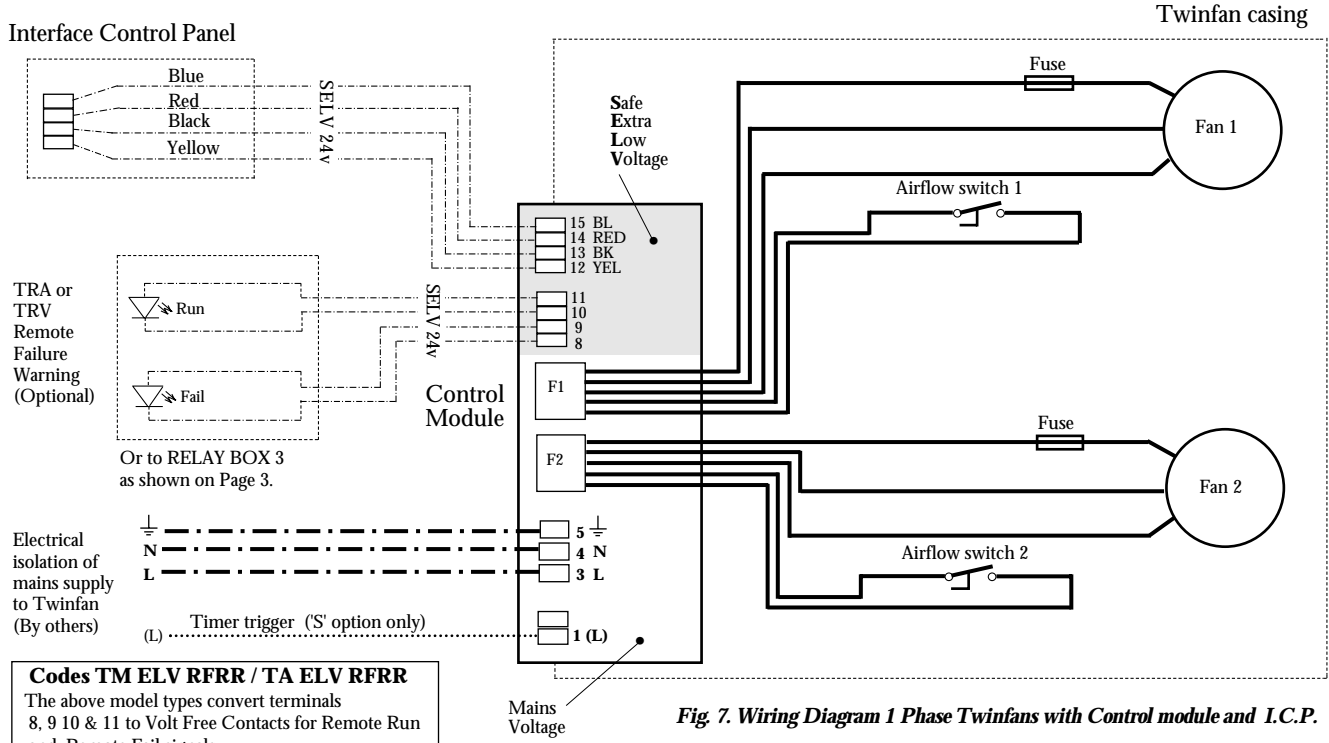


Fig 7. Wiring Diagram 1 Phase Twinfans with Control module and I.C.P.

Wiring note:
The screened braiding on the Signal Cable between the I.C.P. and the control Module should be connected to Earth inside the Twinfan Unit.

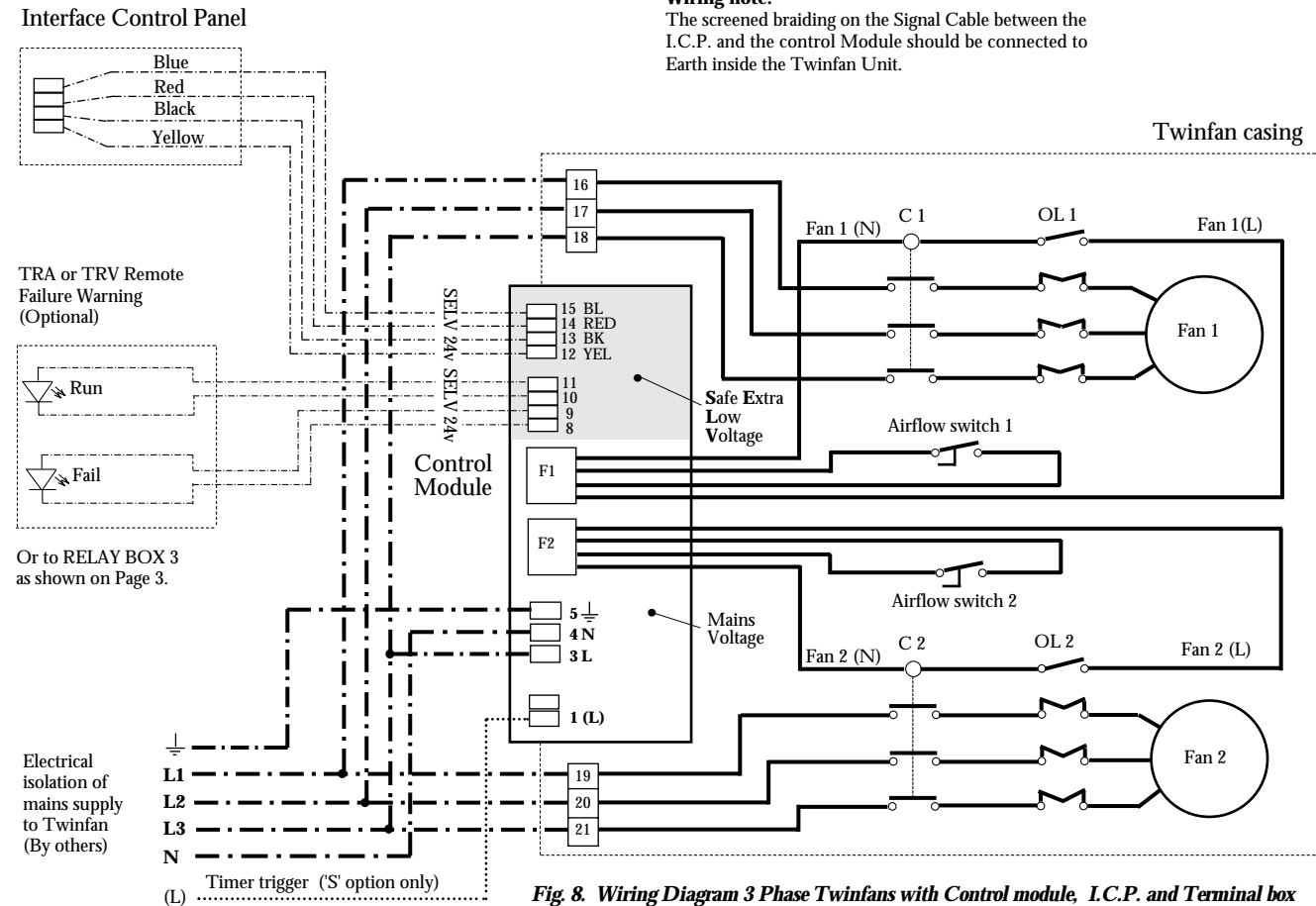
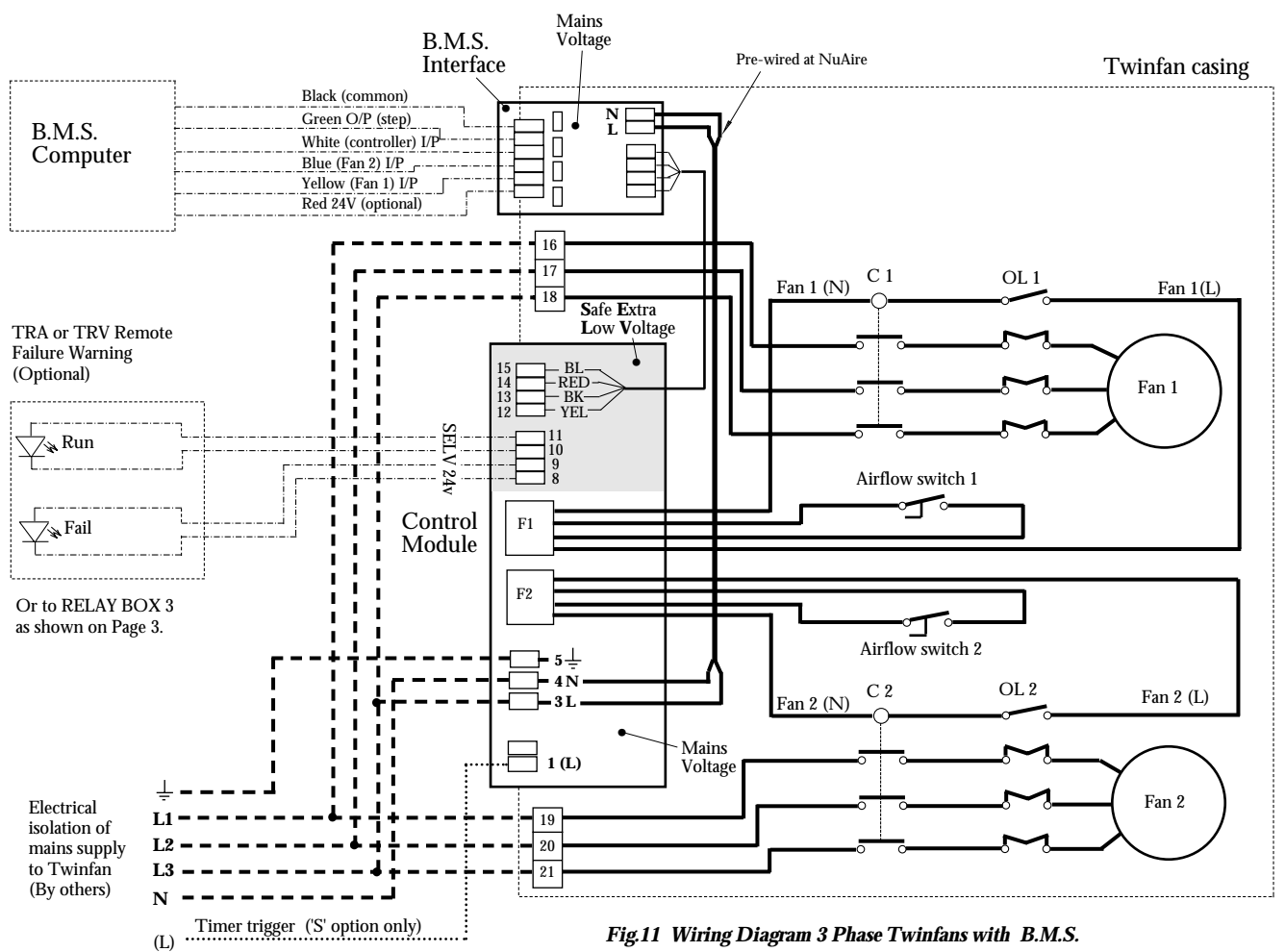
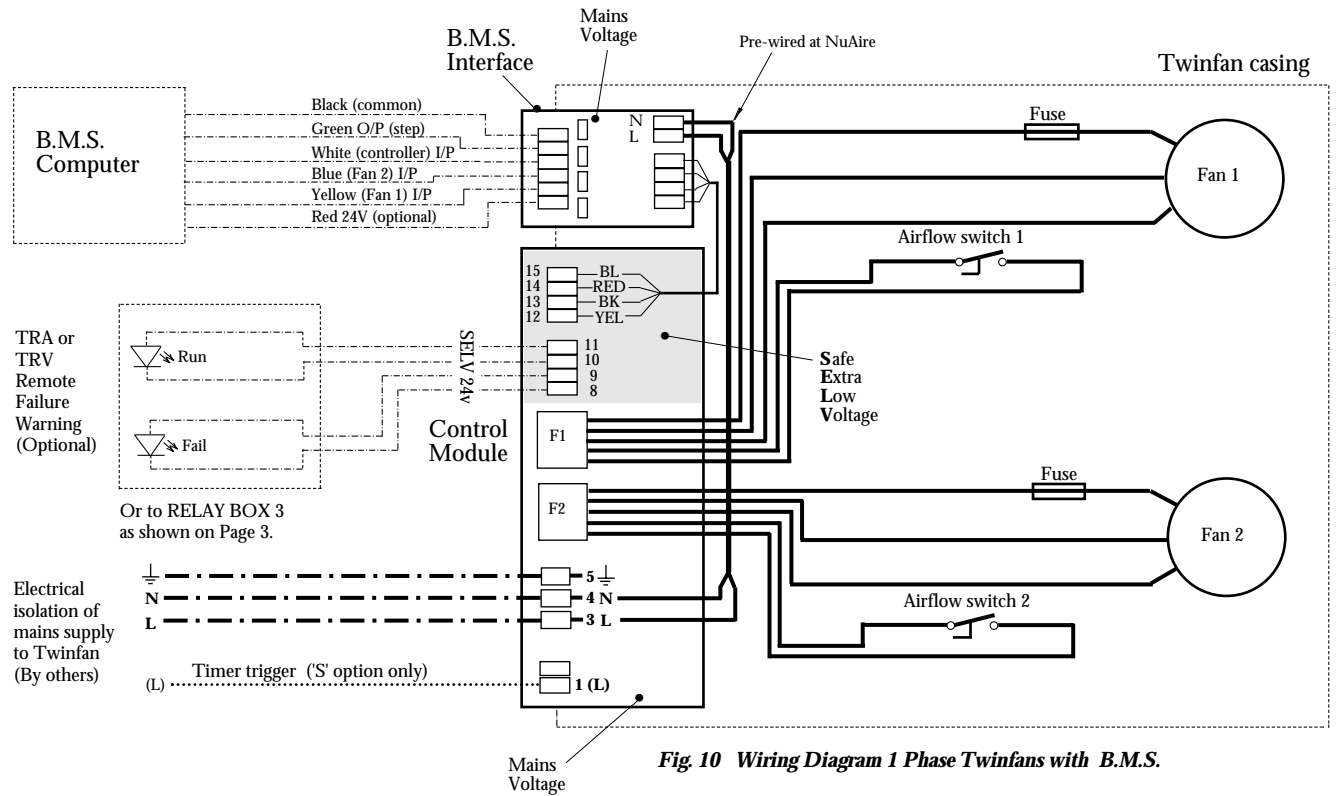


Fig 8. Wiring Diagram 3 Phase Twinfans with Control module, I.C.P. and Terminal box

WIRING DIAGRAMS (continued)



Wiring Diagrams (continued)

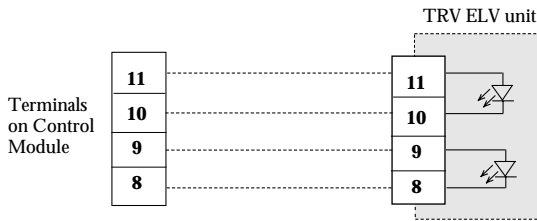


Fig.15 TRV ELV Option remote 'Run and Fail' indicator (visual warning).

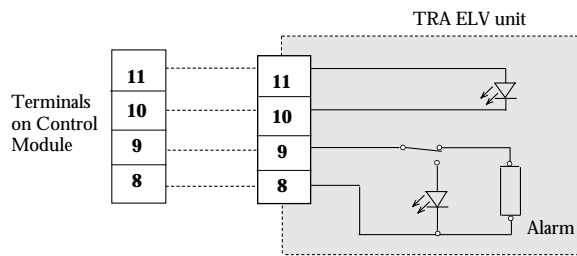


Fig.16 TRA ELV Option remote 'Run and Fail' indicator (audible warning).

NOTE:

It is recommended that before installation is commenced reference is made to the correct Installation and Maintenance leaflet for the particular Twinfan to be used with the Microsave system.

Series 3 Twinfans Installation and Maintenance Leaflet No 670435

Direct Drive Twinfans Installation and Maintenance Leaflet No 670021

Belt Drive Twinfans Installation and Maintenance Leaflet No 670021

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Continued from Page 5 (BMS operation)

TMX BMS Operation

Supply switched pulse between RED & GREEN (24v) to sequence as follows;

* Sequence	Fan 1 Status	Fan 2 Status
Power on	OFF	OFF
a) one pulse	ON	OFF Choose Fan1
b) one pulse	OFF	ON Choose Fan2
c) one pulse	OFF	OFF Choose Fan1

* From 'Power on' the sequence will run a,b,c, a,b,c, a,b,c etc.

d) Failure on Fan 1
 Controller reports FAIL RUN
 one pulse to reset OFF RUN
 begin sequence from (b) above.

e) Failure on Fan 2
 Controller reports RUN FAIL
 one pulse to reset OFF OFF
 begin sequence from (c) above.

Note: When failure occurs the Controller will lock in either condition (d) or (f) depending on which fan fails. This indicates that maintenance is urgently required on the failed fan.

Coding BMS

Basic Code	Micro save	Phase	Twinfan type
TMXBMS	ELV	1 or 3	S3/ DD/BD

The letters BMS are included in the Microsave control System Option Code after the basic Control letters e.g. TMX BMS. With this option the Control Module and the B.M.S. Interface are installed within the Twinfan unit. All functions of the B.M.S. Interface may be transmitted to a B.M.S. which could operate and monitor the status of the controller.

Technical or commercial considerations may, from time to time, make it necessary to alter the design, performance and dimensions of equipment and the right is reserved to make such alterations without prior notice.

Series 3 Twinfan	Timer adjustment (optional)	Direct Drive Twinfan	Retaining screws
Control Module	Cable restraint	Fan 1 /Fan 2 identification labels	Reset buttons
7 / 0.1mm PVC coated four core cable	Cable restraint	B.M.S. Interface (Optional)	Contactor and Overload compartment
Interface Control Panel (I.C.P.)	I.C.P. connections (colour coded)	Control Module	3 phase supply
TRA/TRV Option	Norm. open Common Remote Run terminals	Outlets	Contactors and overloads
To switched live supply (TMS option)	Norm. open Common Remote Fail terminals	Belt Drive Twinfan	2 Amp fuse
Fan 1 /Fan 2 identification labels	Fan 1 Fan 2	Fan 1 /Fan 2 identification labels	3 Phase connections
Control Module	E N L Mains supply	Control Module and Contactors	Control circuitry
Mains supply via isolator	(L) Switched live for'S' Timer option only	Location of BMS Interface (when fitted)	B.M.S. Interface (Optional)
BMS Interface	Earth post	B.M.S. Interface	B.M.S. connections
Cable exit			B.M.S. Interface
To TRA / TRV (optional)		B.M.S. Connections	Mains supply
To I.C.P.			Black Green White Blue Yellow Red
To switched live supply (TMS option)		Control Module	B.M.S. Module
Series 3 Twinfan			
To customers B.M.S.			