

Twinfans

Roof and Plantroom Belt Drive and Direct Drive Extract Units

NUAIRE

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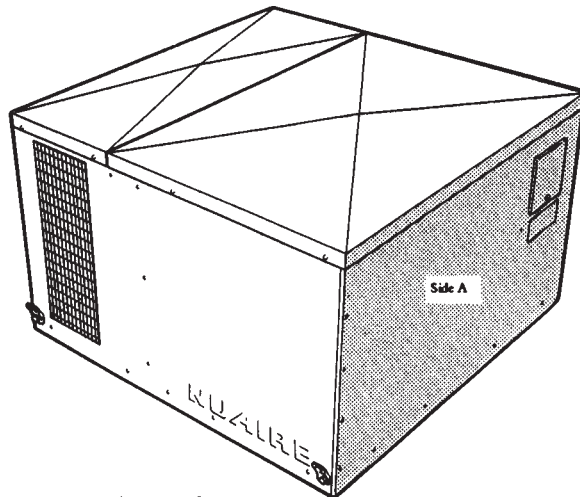


Fig. 1. General view of unit.

Introduction

This leaflet covers the direct drive and belt drive twinfan range of extract units. The unit code reference is made up from the fan diameter followed by the method of drive e.g. 190 DD is a unit fitted with 190mm dia. fans that are directly driven, 330 BD is a belt drive unit with 330mm dia fans.

The unit casing is aluminium alloy and forms a rectangular box which houses two independent centrifugal fans, driven by separate motors. On the Belt Drive units the fans, motors and drives are mounted on a heavy angle chassis supported on the unit base plate by resilient mountings. The fans discharge into a common outlet plenum chamber protected by a linked shutter system which prevents 'blow back' through the standby fan.

On units 240 DD to 380BD, the casing is closed by a top cover in two pieces. On units 100 DD to 220 DD, a one piece cover is used. The covers are easily removable for access to the fans and motors for servicing purposes. The underside of the cover which houses the inlet chamber is acoustically lined. Non rusting fasteners are used throughout.

Units are supplied for installation in the open on a roof, or in a plantroom. For roof mounted units, an inlet spigot is provided in the bottom of the units as standard. However, other inlet spigot positions can be specified at the time of ordering. The Plantroom units have a side inlet spigot, and outlet spigot for connection to a duct. Roof mounted units discharge into the open air through a plenum chamber designed to guarantee that the flow rate is unaffected by winds.

NuAire Twinfans are delivered to site ready to be secured to an upstand and to be connected to the ducts and the electrical supply.

Handling

These units must be lifted by the base only. Sizes 240DD and above are fitted with four eyebolts, one on each corner for hoisting. Care must be taken to ensure that any slings used do not damage the casing.

IMPORTANT NOTE!

These units are NOT suitable for vertical mounting. If roof mounted, the angle of installation must not exceed 5° from the horizontal.

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Dimensions and weights

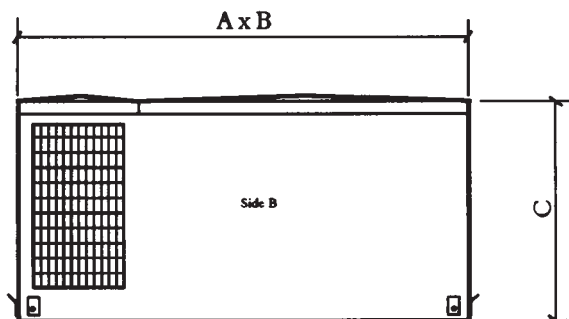


Fig. 2. Outline dimensions of unit.

Table 1 Dimensions.

Unit Code	Dimensions in mm			Weight kg
	A	B	C	
100DD	470	470	260	9.6
150DD	686	686	420	18.2
190DD	686	686	420	22.9
220DD	859	859	480	31.1
240DD	974	974	622	57.0
270DD	974	974	622	57.0
260BD	974	974	622	100
330BD	1233	1233	701	141
380BD	1430	1635	796	210
500BD	2100	2500	1230	-

Dimensions:

Fig. 3. Roof opening and Curb details.

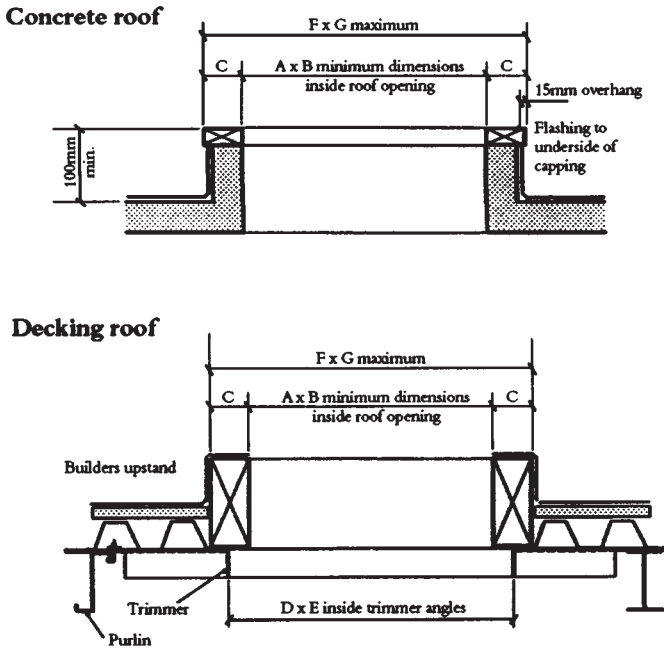


Table 2. Curb & roof opening dimensions

Unit Code	Dimensions in mm						
	A	B	C	D	E	F	G
100DD	317	317	50	361	361	447	447
150DD	530	530	50	544	544	660	660
190DD	530	530	50	544	544	660	660
220DD	653	653	75	747	747	833	833
240DD	767	767	75	837	837	947	947
270DD	767	767	75	837	837	947	947
260BD	767	767	75	837	837	947	947
330BD	973	973	100	1064	1064	1203	1203
380BD	1169	1375	100	1268	1471	1399	1605
500BD	1500	2200	100	1600	2300	1750	2450

Installation

The unit must be securely screwed to its curb or mounting to prevent vibration and wind damage. All duct connections must be airtight to prevent loss of performance.

On BD units remove the 'red' transit support brackets on the motor frames before operating the unit.

If a unit is converted from 'bottom-inlet' to 'side-inlet' after installation, the redundant bottom inlet must be blanked off either at the unit base or as near as possible to the ductwork. It is essential that the cross sectional area of such side inlets is not less than that of the original bottom inlet, otherwise severe reductions in duty will occur.

Cable entry to the terminal box inside the unit may be made either through the bottom inlet spigot on roof units or through a hole drilled in the unit casing in a convenient position as on the plantroom unit. This cable entry hole must be sealed to avoid any performance loss.

Maintenance

(Units 100 DD, 150 DD, 190 DD, 220 DD, 240 DD, 270DD).

NOTE:
Before commencing work, isolate the electrical supply.

Access to the fan and shutter assemblies is gained by removing the top cover. The larger one covers the motor and fan assembly, the smaller one covers the shutter assembly and plenum chamber. Isolate the unit and inspect the following items three months after commissioning and then once per year.

Motors.

Remove any dust or dirt. Lubrication is unnecessary as the motors are fitted with bearings that are sealed for life.

Impellers.

Remove any dust and check that the impellers are securely fixed to the motor shafts. Take care not to disturb any balance weights fitted.

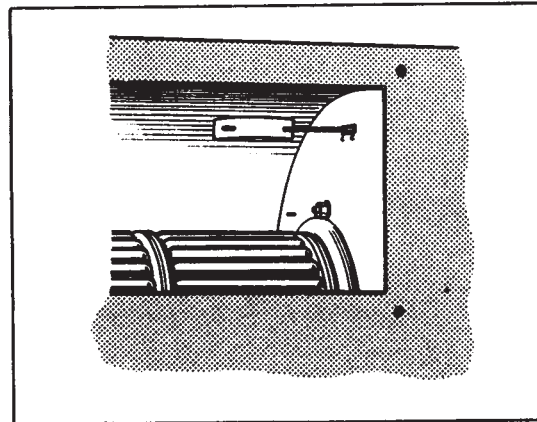


Fig. 4a Auto change-over flagswitch detail (DD units)

Airflow Flag / auto changeover switches.

Check that the flag switches operate freely by moving the flag arm. (A click will be heard when the switch operates).

NOTE: Do not alter the angle of the flag arms.

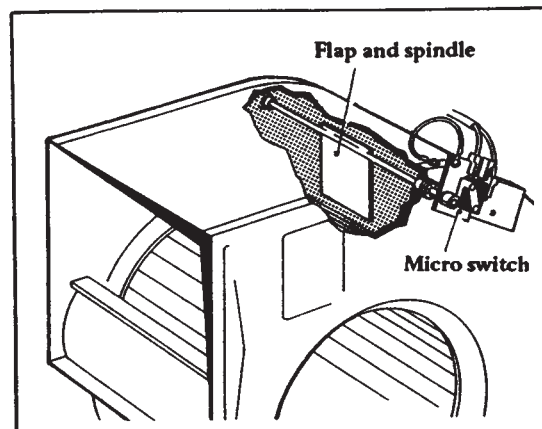


Fig. 4b Auto / change-over flap switch detail (BD units)

Shutter Assembly

Remove any dust and check that the shutters operate freely.

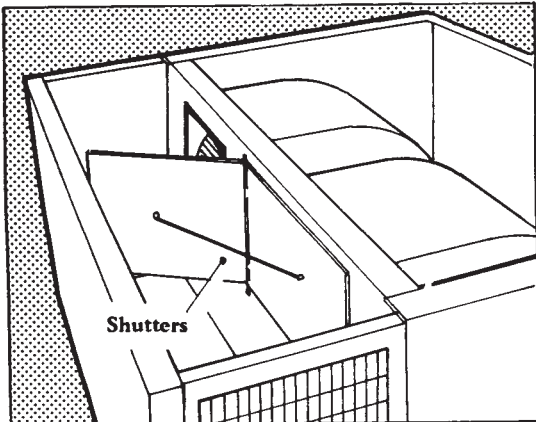


Fig. 5 Twinfan shutter detail.

Maintenance continued

(Units 260BD, 330 BD, 380 BD, 500BD).

NOTE:

Before commencing work, isolate the electrical supply.

Access to the fan and shutter assemblies is gained by removing the top cover. The larger one covers the motor and fan assembly, the smaller one covers the shutter assembly and plenum chamber. Isolate the unit and inspect the following items three months after commissioning and then once per year.

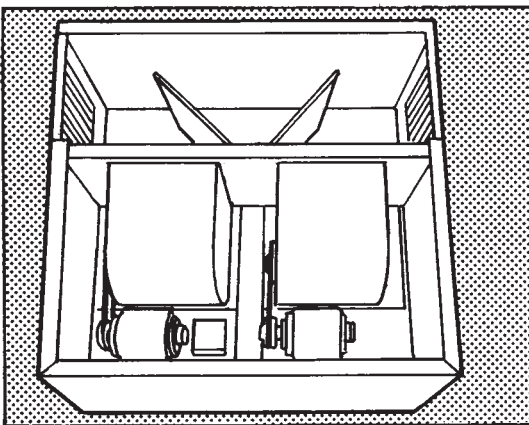


Fig. 6 Unit with top covers removed.

Motors.

Brush away any accumulated dust etc. from the motor housings and ensuring that the motor air vents are not blocked.

All single phase Direct Drive motors have integral thermal protection as standard.

Bearings

Motors are lubricated during manufacture and the bearings are sealed for life, no maintenance is necessary.

Belts

All belt drive units incorporate belt tensioning devices. To adjust the belt tension, slacken the pinch bolts on the sides of the motor plate. Turn the adjusting bolt clockwise to tighten the belt; counter clockwise to loosen it.

The drive should be tensioned until a slight bow appears on the slack side of the V belt when running under load. To check for correct tension proceed as follows:

1. Measure the span length. (See fig.7).
2. At the centre of the span, apply a force at right angles to the belt sufficient to deflect one belt 16mm for every metre of span length. (See fig.7). The force required to deflect the V belt should be from 0.5kg to 0.8kg.

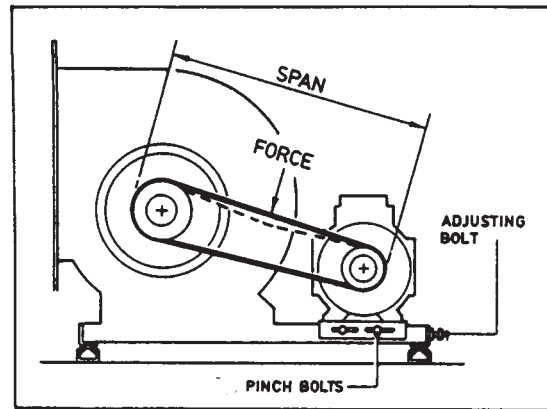


Fig. 7 Tensioning the drive belts.

Impellers.

Remove any dust and check 'sealed for life' bearings for excessive wear.

Airflow / auto changeover flap switches, (Fig. 4b).

Rotate the spindle of the flap switch by moving the flap inside the blower and check that it is free to rotate and that the micro switch operates (a click will be heard when the switch operates).

Shutter Assembly

Remove any dust and check that the shutters operate freely. (See fig.5).

Anti Vibration Mountings.

Check that they are secure and in good condition (see fig. 8).

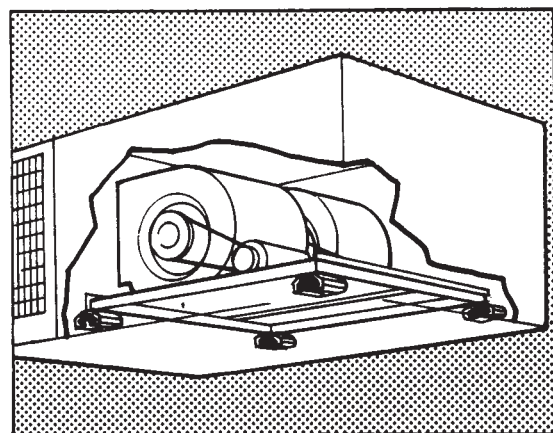


Fig. 8. Anti vibration mountings

General

1. Check all fastenings are tight.
2. Check sealing strips around fan outlets are tight up against case bulkhead.
3. Check that duct connections are not leaking.

Use in chlorinated atmospheres

Motors

NuAire Direct Drive Twin Fans incorporate motors which have been specially treated at the factory to resist the effects of raw chlorine fumes, sulphur dioxide fumes and salt-laden atmospheres.

This treatment takes the form of vacuum impregnation with a special corrosion inhibitor which ensures that the hidden parts of the motor and bearings are fully protected as well as the visible parts.

Once the initial treatment has been carried out, no further maintenance treatment is required.

Twinfan Unit

The Twinfan can be specified with a polyester coating which includes the impeller and all exposed parts.

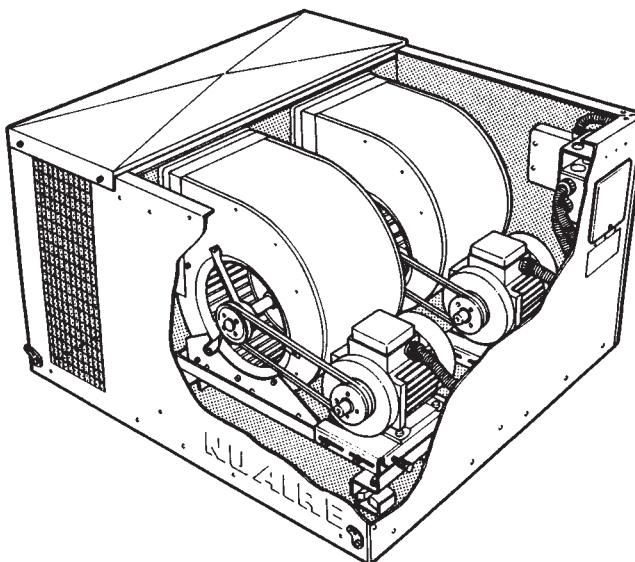


Fig. 9 Typical NuAire Belt Drive Twinfan unit.

Spares

When ordering spares always quote the unit serial number and also the part number as shown in the table below. If possible, quote the full unit code

NUAIRE				Western Industrial Estate Caerphilly Mid Glamorgan CF8 1XH Telephone: 0222 885011 Facsimile: 0222 887033 Telex: 457387 nuair g	
SERIAL No.	CODE	B6	ARC No.		
LOCATION	SUPPLY	V	β	HZ	
FLC	START	OVERLOAD			

When ordering spares please quote your unit serial number which is stamped on a label affixed to the unit casing.

Table 4. Twinfans - Major Spares

Unit Reference	100 DD	150 DD	190 DD	220 DD	240 DD	270 DD	260 BD	330 BD	380 BD	500 BD
Top Cover	770517	770518	770518	770519	512862 B1 770520 B2	5122862 B1 770520 B2	5122862 B1 770520 B2	770587 B1 770521 B2	512858 B1 770522 B2	514557 C1 2 off 514558 C2 1 off
Fan Assembly	770537	770538	770539	770540	770541	770711	770572	770573	770574	770988 inc. A/flow switch
Shutter	770712	770713	770714	770715	770716	770718	770670	770671	770672	620616
Isolator	771013	771013	771013	771013	771013	771013	770286 A1 770308 A2	770286 A1 770308 A2	770286 A1 770308 A2	Refer to NuAire
Air Flow Switch	270093	270093	270093	270093	270093	270093	771032	770743	770743	See above

Spares Notes:

Units 100 DD to 220DD are designed with a case manufactured in one piece with two apertures to accommodate the grilles.

Units 100 DD to 220 DD have one top cover. Units 240 DD to 380 BD have two top covers; one for the plenum chamber (small cover) which houses the shutter assembly, the other for the suction chamber which contains the motor and fan assemblies.

A wide selection of drive belts are used. When ordering replacements please quote the belt reference number (SPZ - - - -).

All units are fitted with 270093 automatic changeover switches except when a unit is specified with single phase motors having a full load current of 3 amps to 5 amps, in which case the 770743 or 771032 switch is fitted. For 1 phase motors with a full load current exceeding 5 amps please quote the unit serial number when ordering replacement automatic changeover switches.

- | | |
|---------------------------|-----------------------|
| (A1) Single Phase | (A2) Three Phase |
| (B1) Plenum Chamber Cover | (B2) Motor Cover |
| (C1) Top Cover ends | (C2) Top Cover centre |

Electrical Details.

Table 5. Starting and Running Currents for Direct Drive Units.

Unit Code	Motor Input Power Watts	Full Load Current Amps	Starting Current Amps*
100 DD	81	0.58	1.40
150 DD	91	0.54	1.50
190DD	219	1.36	4.60
220DD	328	1.30	5.50
240 DD	511	2.24	7.90
270 DD	915	5.00	18.00

* Starting current quoted is for both motors starting together as when the unit is used with the NuAire Twinfan Control System.

All Direct Drive units are for Single Phase operation and are designed to be used in conjunction with a NuAire Twinfan Control, although an independent type of control system can be employed.

Table 6. Starting and Running Currents for Belt Drive Units.

Motor Output Power kW	240V 1Phase 50Hz		415V 3Phase 50Hz	
	Full Load Current Amps	Starting Current Amps*	Full Load Current Amps	Starting Current Amps*
0.18	N/A	-	0.75	4.60
0.25	2.10	10.60	0.95	6.00
0.37	2.90	14.60	1.30	9.20
0.50	3.40	18.60	-	-
0.55	-	-	1.70	13.60
0.75	-	-	2.10	19.00
1.10	-	-	2.90	26.00
1.50	-	-	3.70	37.00
2.20	-	-	5.40	54.00
3.00	-	-	6.90	76.00
4.00	-	-	10.00	120.00
5.50	-	-	12.00	150.00

* Starting current quoted is for both motors starting together as when the unit is used with the NuAire Twinfan Control System.

The approximate running currents shown are typical values and will depend upon the duty of the unit and the resistance of the associated ductwork.

If the unit is operated with the top cover removed or with the ductwork disconnected these typical running currents will be exceeded and may even exceed the rated current of the motor.

It is important therefore, that the unit is not run for more than a few seconds at a time with the top cover removed or the ductwork disconnected.

Failure to observe this precaution may lead to damage to the motor or associated circuits.

Electrical Details

DIRECT DRIVE TWINFANS

SINGLE PHASE

General

Extract units are supplied with independent terminal connections to the motors and air-flow switches, facilitating wiring into any approved control system.

An electrical isolator (by others) must be provided to enable motors and sensing switches to be isolated from the electrical supply when required for maintenance or any other purpose.

Links are factory fitted as shown on the wiring diagrams to minimise installation costs. These links may be removed as necessary to suit individual installation requirements.

Starting and Running currents

The starting currents quoted on page 5 are approximate, and are for both motors starting together as in a NuAire Twinfan Control System, when motors will run momentarily together until the duty fan reaches sufficient speed to operate its sensing switch. For single fan starting in some other arrangement the figure should be halved.

Running currents quoted are typical values and will depend upon the duty of the unit and the resistance of any associated ductwork.

If the unit is operated with the top-cover removed or with the ductwork disconnected these running currents will be exceeded and may even exceed the rated current of the motor.

It is therefore important that the unit is not run for more than a few seconds at a time with the top cover removed or with the ductwork disconnected, as this may result in damage to the motor or associated circuits.

On all Direct Drive units individual fusing is fitted as standard. Each motor has its own fuse which is rated to suit the motor size.

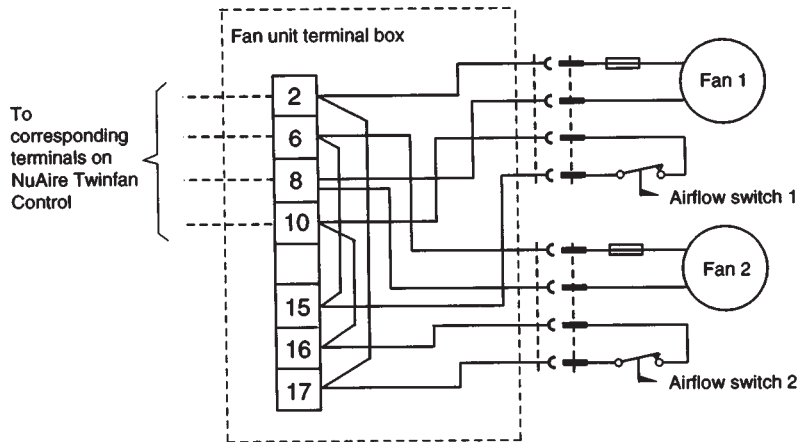


Fig. 10 Single Phase wiring diagram

Direct drive units are supplied for Single Phase operation only

Electrical Details
BELT DRIVE TWINFANS

SINGLE & THREE PHASE

General

Extract units are supplied with independent terminal connections to the motors and air-flow switches, facilitating wiring into any approved control system.

An electrical isolator (by others) must be provided to enable motors and sensing switches to be isolated from the electrical supply when required for maintenance or any other purpose.

Links are factory fitted as shown on the wiring diagrams to minimise installation costs. These links may be removed as necessary to suit individual installation requirements.

Belt Drive units requiring motors up to and including 0.37 kW can be supplied for either single phase or three phase operation. Belt drive units requiring motors above 0.50 kW are supplied for three phase operation only.

Starting and Running currents

The starting currents quoted on page 5 are approximate, and are for both motors starting together as in a NuAire Twinfan Control System, when motors will run momentarily together until the duty fan reaches sufficient speed to operate its sensing switch. For single fan starting in some other arrangement the figure should be halved.

Running currents quoted are typical values and will depend upon the duty of the unit and the resistance of any associated ductwork.

If the unit is operated with the top-cover removed or with the ductwork disconnected these running currents will be exceeded and may even exceed the rated current of the motor.

It is therefore important that the unit is not run for more than a few seconds at a time with the top cover removed or with the ductwork disconnected, as this may result in damage to the motor or associated circuits.

Overloads

All overloads must be set to the maximum full load current of the equipment they are protecting. The recommended overload setting will be found on the test certificate issued with every unit.

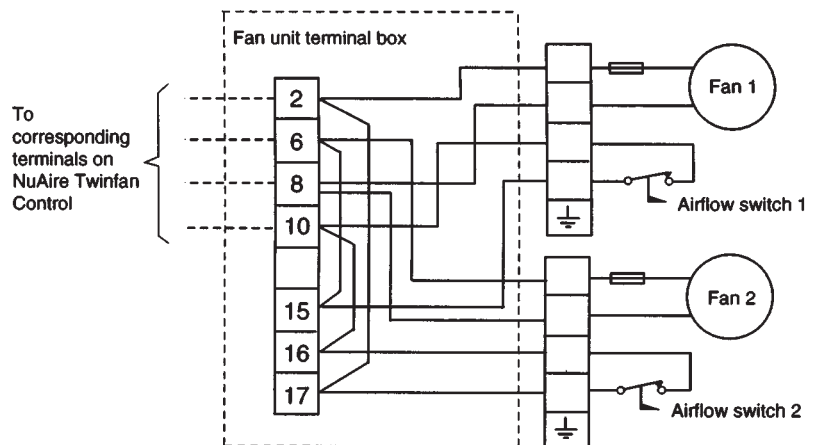


Fig. 11 Single Phase wiring diagram (260 BD)

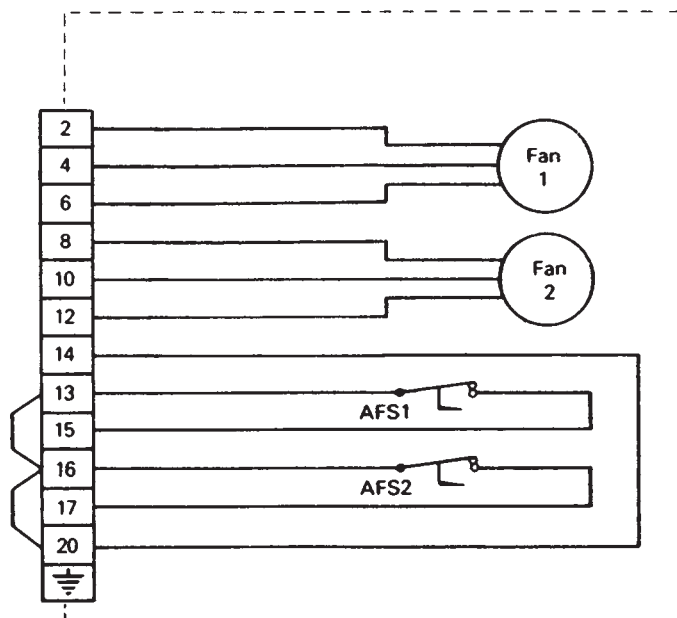


Fig. 12 Three Phase wiring diagram. (260BD, 330BD, 380BD, 500BD)

Controls & Remote Indicators

Belt Drive and Direct Drive

Information and Dimensions

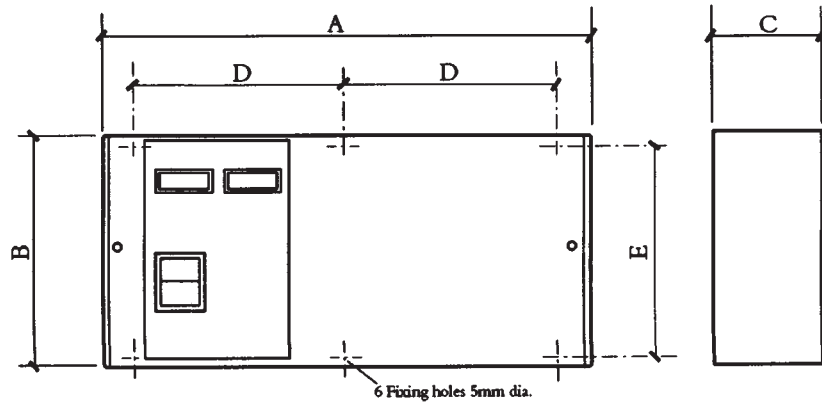
NuAire produces a range of Control and remote indicator units specially designed for use with Twinfan extract units. Variants of the control units can provide as required;
Manual selection of either of the two fans.

Automatic change over from a failed fan to the standby one.

Run on operation adjustable between 5 and 30 minutes after the initiating source (coupled roof light or similar) has been switched off.

Automatic duty sharing giving change over from one fan to the other at 12 hourly intervals.

Local and fail indication.



Dimensions (mm)		A	B	C	D*	E*
Single Phase units	TMC1	160	140	75	50	124
	All others	317	140	75	125	124
Three Phase units	All units	317	185	105	128	170

* Note dimensions D & E refer to fixing hole centres

Table 7 Control Dimensions

Remote Run/Fail Indicators.

Single and Three phase

Remote indicators are supplied for connection to the control units. They provide visual indication that the fan is running and, where required, audible or visual indication of fan failure at some remote location.

Both indicator versions are compatible with all twinfan control units and may be used in pairs to provide remote indication in more than one location.

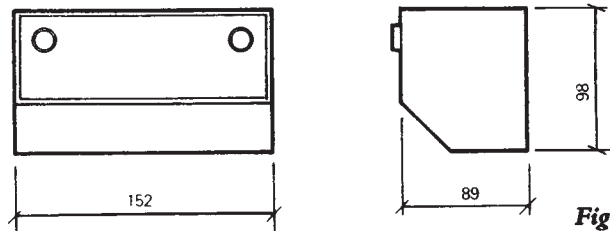


Fig. 14 Run / Fail indicator.

TRA

Designed as a remote indicating extension of TM and TA control units, the TRA unit provides audible warning of a fault condition. The audible warning can be silenced by a manually operated muting switch, but this lights a visual indicator which remains as an indication that the switch has been changed over to the muted position.

Fig. 15 TRA Wiring

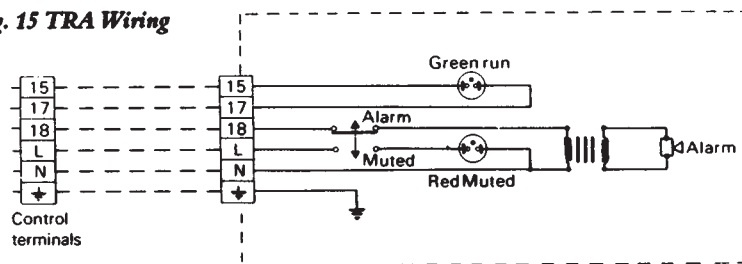
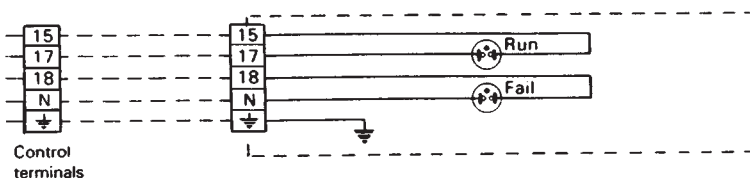


Fig. 16 TRV Wiring diagram.



TRV

Also designed as a remote indicating extension of the TM and TA control units, the TRV unit provides positive indication at a remote location of the fan condition by means of 'run' and 'fail' indicator lamps.

Remote Fail Indicator

RFI

Remote fail indicators provide visual warning of fan failure at a convenient position remote from the fan and / or main control unit. Standard single MK switch box housing, red indicator lens.

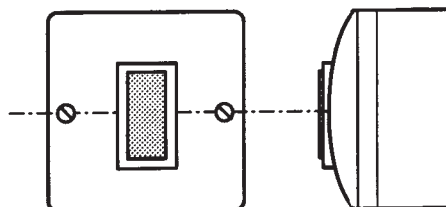


Fig. 17 Remote Fail Indicator.

Controls

SINGLE PHASE

TMC1

This control provides manual selection of either fan for duty sharing or test purposes through a selector switch, in addition to automatic changeover on fan failure. Loss of airflow is detected by the selected fan sensing switch (a normally closed switch, open when airflow is correct). The switch closes to bring into operation the standby fan to maintain full extraction. At the same time a local failure warning lamp lights and a remote warning indicator, if installed, is energised. Integral fuses protect the control and associated wiring.

TMXC1

Similar to the TMC1 control unit, the TMXC1 has, in addition, a two pole on-off switch to isolate the incoming line and neutral.

TMSC1

Again similar to the TMC1 control unit, the TMSC1 unit has, in addition, an electronic timer. The timer maintains the fan running for a period adjustable between 5 and 30 minutes approximately, after the initiating source (coupled light switch or similar) has been switched off.

TAC1

This control unit provides automatic duty sharing facilities, as well as the automatic change over on fan failure described for the TMC1 unit. An incorporated timing mechanism brings alternate fans into operation at 12 hourly intervals, ensuring optimum duty sharing and thus maximum bearing life. An override switch is fitted to allow manual selection for test purposes.

ITA1

Functionally similar to the TAC1 control unit, with automatic duty sharing and change over on fan failure, the control components and fuses are, in this application, built into a damp and dustproof housing mounted within the unit and interconnected at the factory to the fans and sensing switches.

Example (Belt drive)

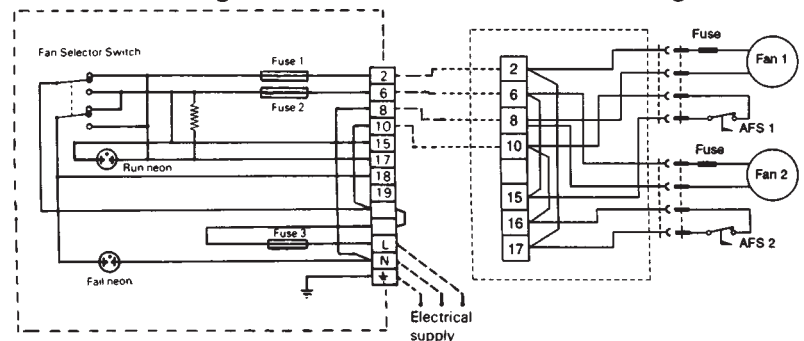
Unit ref, 260 BD1/25 required with ITA control would be coded : 260 BD 1 ITA / 21

Example (Direct drive)

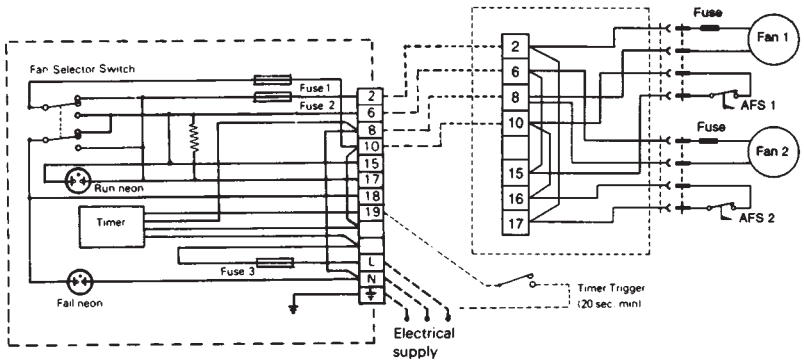
Unit ref, 240 DD1 required with ITA control would be coded : 240 DD1 ITA.

Control Wiring

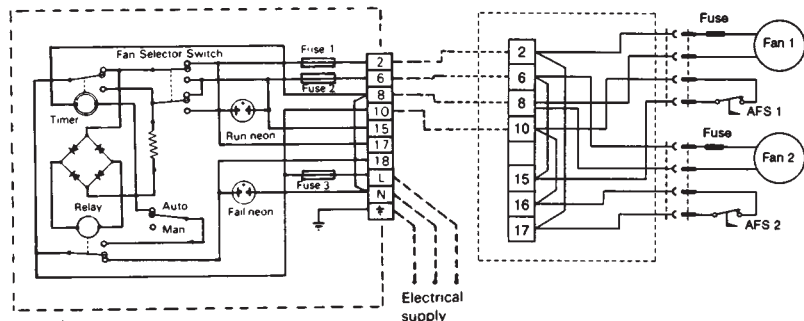
Twinfan Wiring



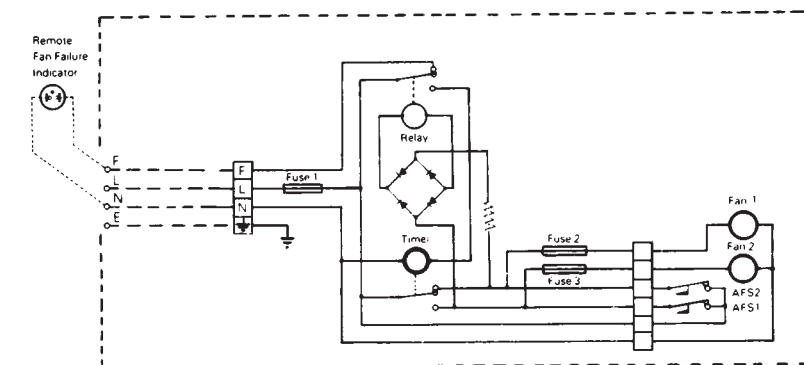
TMC1



TMSC1



TAC1



ITA

Fig. 18 Direct Drive and Belt Drive Single phase Controls wiring diagrams

NOTE:

Twinfans are fitted with individual fuse protection as standard. Each fan has its own fuse rated to the size of the motor.