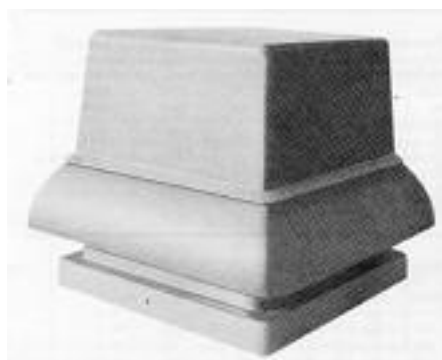


Colchester Range of Roof Extract Units



Safety, Installation, Operation and Maintenance Instructions

Part No. 502956

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SAFETY

WARNING: ONLY APPROVED PERSONNEL FAMILIAR WITH THE ASSESSMENT OF HAZARDS AND RISKS ASSOCIATED WITH FANS SHOULD INSTALL, OPERATE AND MAINTAIN THE PRODUCT.

IF THE INSTALLER OR USER IS UNABLE TO UNDERSTAND THE INFORMATION IN THIS MANUAL, OR HAS ANY DOUBT THAT A SAFE AND RELIABLE INSTALLATION, OPERATION AND MAINTENANCE OF THE EQUIPMENT CAN BE ASSURED, WOODS AIR MOVEMENT OR THEIR REPRESENTATIVE SHOULD BE CONTACTED FOR ADVICE.

WARNINGS AND SAFETY INFORMATION RELEVANT TO SPECIFIC OPERATIONS ARE CONTAINED IN THE PARAGRAPHS TO WHICH THEY APPLY.

IF ROOF UNITS ARE RETAINED IN STORAGE, ACCESS BY UNAUTHORISED PERSONS MUST BE PREVENTED WITH THE USE OF GUARDS, BARRIERS OR SECURE PREMISES SUCH THAT FAN IMPELLERS WHICH MAY BE ROTATING DO NOT PRESENT A HAZARD.

1 INTRODUCTION AND PURPOSE

1.1 General

1.1.1 The 'Colchester' range (Types DSP, DVP, DSM, DVM, DSC, DVC, BSM, BVM, BSC and BVC) of roof extractor units are designed to remove air, at roof level, from buildings. Each type of roof unit of similar size has the same type of purlin or curb mounting (see Paragraphs 2.5 and 2.6).

When units DSP, DSM and DSC are converted for wall mounting (see Paragraph 2.7) they are re-designated as Types WDP, WDM and WDC respectively.

When the DSP unit is purchased for air input to a building (see Paragraph 2.6.2) it is re-designated Type DPI.

The motor(s) within the roof units are generally rated for continuous operation in temperatures of between -40 to +50°C (122°F); however the DSP and DVP roof unit motors are rated for operating between -18 to +40°C (104°F).

1.1.2 Each type of unit has been manufactured specifically to fulfil a particular requirement. No deviation from the original requirement should be implemented without referring to Fläkt Woods Limited head office in Colchester. If the extracted air is liable to contain corrosive fumes or flammable/explosive gases, Woods or their representative, should be consulted for advice. Any queries regarding safety or operating problems should be referred to Woods, or their representative, together with full fan/motor nameplate details. Should a fan failure occur whilst the product is under warranty, the Fläkt Woods service centre in Colchester should be contacted before any repair work is undertaken.

1.2 Speed control

- 1.2.1 The amount of extracted air can be varied by using a Fläkt Woods electronic or transformer speed controller, however sufficient speed must be maintained to open the unit shutters.
- 1.2.2 A frequency inverter type speed controller should only be used to control roof units if the inverter complies with Fläkt Woods Product Information Specification C22a.02. A copy of the specification is available from Fläkt Woods Limited.

1.3 Storage and handling

- 1.3.1 If the roof unit is to be stored; check immediately on receipt that it is as ordered and as required, and that it has not been damaged in transit. Where the roof unit is delivered in a crate/box or similar, the whole package should be considered as a protective device only. The package must not be used as a lifting aid, and should be moved with care. The package must not have equipment stored on top of it, nor should it be stacked on other equipment. All roof units should be stored in a safe, clean, dry, vibration free, location. If such storage conditions are not available the motor anti-condensation heater (if fitted), should be connected to an appropriate electrical power supply to prevent motor condensation forming, and the unit should be stored in an appropriate container. A regular monthly rapid rotation of the impeller is recommended to prevent grease deterioration and possible brinelling of the bearings; the impeller should not be in the same angular position after rotation.
- 1.3.2 When dismantling the crate/box to gain access to the unit care should be taken to avoid injury from sharp edges, nails, staples, splinters, etc.
- 1.3.3 If the unit is to be stored for 12 months or more, an inspection by Fläkt Woods Limited service centre in Colchester before commissioning is advised.

1.4 Potentially Explosive Atmospheres/Atex

Important Note:

Roof fans type DSM, DSC and DSJ may be supplied with motors designated for use in potentially explosive atmospheres. Regardless of the motor classification, these fans are supplied as Category 3G equipment. **They are only suitable for use in Zone 2 classified risk areas.**

Shutters

It is vital that air operated shutters are checked for correct operation to avoid any risk of spark generation.

Before switching on the fan for the first time, inspect the shutters and ensure that they will move freely. Check that there is good clearance for the shutters and that there is no possibility of rubbing or fouling of the shutter blades. Examine the foam rubber buffers: they must be intact, in good condition and securely fixed in place.

Repeat the above procedure at a minimum of 6-monthly intervals. In addition, make sure that the shutters and foam buffers are clean. Check the condition of the buffers and the shutter pivot assembly components. Replace any parts that are damaged or worn.

2 MECHANICAL INSTALLATION

WARNING: THE ROOF UNIT CONTAINS ROTATING PARTS AND ELECTRICAL CONNECTIONS WHICH CAN BE A DANGER AND CAUSE INJURY. IF THERE IS ANY DOUBT THAT A SAFE AND RELIABLE INSTALLATION OF THE EQUIPMENT CAN BE ASSURED; Fläkt Woods Limited OR THEIR REPRESENTATIVE SHOULD BE CONTACTED FOR ADVICE.

SAFETY GUARDS MUST ALWAYS BE IN PLACE IF ACCESS TO THE FAN IS POSSIBLE BY PERSONNEL FROM ABOVE OR BELOW. ADDITIONALLY AN AIR INTAKE GUARD MUST BE FITTED IF THERE IS A RISK OF INJURY TO PERSONNEL BELOW THE UNIT SHOULD THERE BE A MECHANICAL FAILURE OF THE IMPELLER. ADVICE ON SAFETY AND GUARDS IS AVAILABLE FROM Fläkt Woods Limited.

ALL LIFTING AIDS USED DURING INSTALLATION, AND ALL LIFTING POINTS UTILISED (SEE PARAGRAPH 2.1), SHOULD BE CERTIFIED TO CARRY THE WEIGHT OF THE EQUIPMENT BEING LIFTED. THE WEIGHT OF THE EQUIPMENT IS INDICATED ON THE ACCOMPANYING PAPERWORK. WHERE THE EQUIPMENT IS DELIVERED IN A CRATE OR SIMILAR THE CRATE MUST BE CONSIDERED AS A PROTECTIVE DEVICE ONLY AND MUST NOT BE USED AS A LIFTING AID.

A SAFETY HARNESS IS SUPPLIED WITH MOST DIRECT-DRIVE ROOF UNITS AND MUST BE FITTED AS DETAILED IN PARAGRAPH 2.3.

BEFORE INSTALLING THE ROOF UNIT ENSURE THAT THE ROOF IS STRONG AND RIGID ENOUGH TO TAKE ITS WEIGHT, ITS POTENTIAL (SNATCH) WEIGHT, AND ANY ADDITIONAL WEIGHT THAT MAY BE APPLIED DURING INSTALLATION AND OPERATION.

DURING LIFTING ALL PERSONNEL SHOULD BE CLEAR OF THE AREA BELOW THE SUSPENDED UNIT.

DUCTING CONNECTED TO THE ROOF UNIT MUST NOT BE SUPPORTED BY THE ROOF UNIT.

ALWAYS WEAR APPROPRIATE PROTECTIVE CLOTHING/SAFETY HARNESSES WHEN WORKING IN THE VICINITY OF THE FAN ASSEMBLY.

NOTE 1: Before installing the roof unit, check that it has not been damaged in transit, that the impeller rotates freely, that all fixings are tight, the shutters operate smoothly, and that the unit nameplate data complies with the requirement of its use. If the roof unit has been stored the resistance of the motor windings to earth, and between the windings, should be measured (at 500V d.c). If any reading is less than ten megohms the motor should be dried and re-checked before it is switched on.

NOTE 2: Care must be taken to ensure that during extremes of wet and windy weather any ingress of water through vertical discharge type roof units, will not reach sensitive or hazardous areas within the building.

2.1 Positioning

2.1.1 Roof units can be heavy, are sometimes unwieldy, and should be lifted slowly to prevent damage and distortion. Proper precautions must be taken, and certified lifting aids used, to ensure the assembly is well supported and stable before lifting into position. Adequate space should be left round the roof unit for routine inspection and maintenance, and the roof structure should not obstruct the flow of air through the unit. The component parts of the roof unit must be fully aligned before being bolted into position in order that no undue stress is placed on the assembly. Packing shims can be used to ensure that the unit is squarely in place. The procedures for lifting the different types of roof unit into position are as follows:

2.1.1.1 On belt drive (BSM, BVM, BSC, BVC) roof units (sizes 400mm and above) four holes are provided as lifting points on the motor mounting frame; access is gained by removing the motor compartment cover.

2.1.1.2 On direct drive (DSP, DSM, DSC, DVC) roof units (larger sizes), two lifting lugs (or four – dependent on unit size) are provided on the cap top.

2.1.1.3 On vertical discharge (DVM, DVP) roof units (larger sizes), two lifting lugs are provided inside the cowl.

2.2 Drain holes

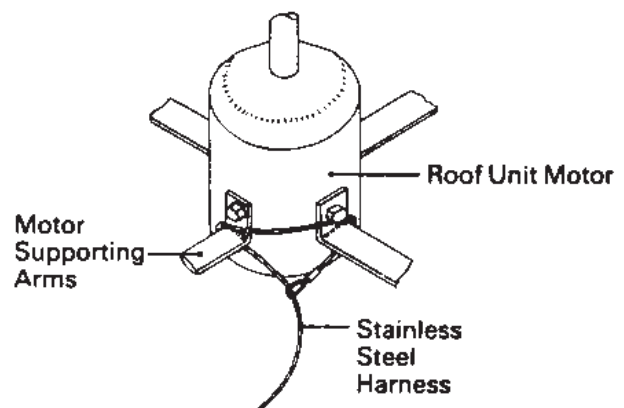
2.2.1 Motors are fitted with a drain hole in each end cover at the lowest point, and in the terminal box. Plugs that cover the drain holes should be removed entirely if condensation is liable to occur due to variations in temperature. If the plugs are left in place they must be removed periodically (see Table 1) to allow any build-up of condensation to drain away. The frequency of plug removal will be dictated by environmental conditions; a record of the procedure should thus be kept.

2.3 Safety harness

2.3.1 A safety harness is supplied with direct drive (DSP, DVP, DSM, DVM, DSC, DVC) roof units. The safety harness stops the motor falling to the floor should the glass fibre structure supporting it become weakened by fire. One end of the safety harness should be attached to the motor support arms as shown on Figure 1, and the other end attached to a permanent fire resistant fixture on the roof structure that can support the motor in the event of it falling. The safety harness must be attached to the motor with **minimal** slack. If in doubt the potential (snatch) load of the motor, additional harnesses **must** be used. The 'safe' operating load of each harness for a particular roof unit curb size is given in the following table:

Unit curb size:	Safe static harness load:
200-500mm	136kg (300lb)
700-1000mm (up to D132 motor)	227kg (500lb)
1000mm (D160 motor)	400kg (882lb)

NOTE: On curb sizes of 800mm and above, two harnesses are supplied and **must** be used. On installations that require a second harness, the second harness should be looped round different motor support arms from the first and attached to a different fixture on the roof structure.



SAFETY HARNESS

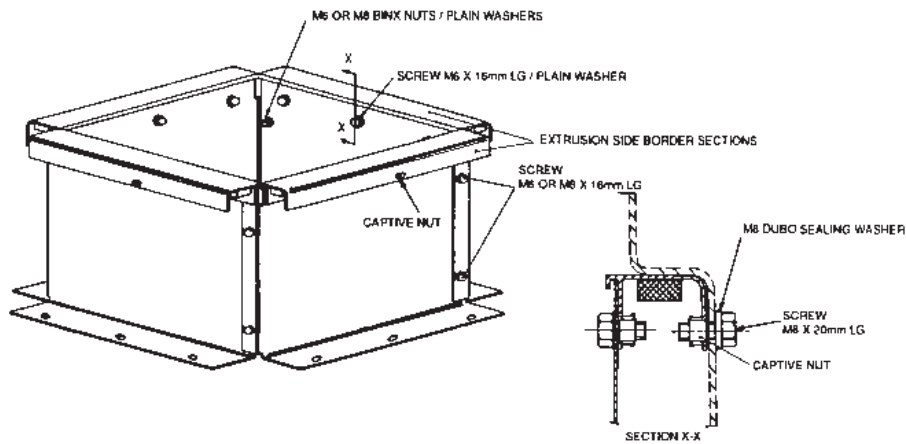
FIGURE 1

2.4 Belt tension

2.4.1 Before installing the belt-driven roof units (BSM, BVM, BSC, BVC) ensure that their belts are in place and are correctly tensioned. Check the belt tension by exerting a force at the centre of the belt to obtain a deflection of 16mm per metre of span. The force required to achieve this deflection on the different types of belt is listed below. After two hours of initial running, and again after three months, re-check the tension of the belt and adjust it if necessary. Replacement belts must be identical to those originally supplied. Pulley drives must not be replaced to increase speed without first referring to Fläkt Woods Limited.

Belt type	Small pulley diameter (mm)	Force (kgf)
SPZ	67 - 95	1.0 to 1.5
	100 - 140	1.5 to 2.0
SPA	100 - 132	2.0 to 2.7
	140 - 200	2.8 to 3.5
Z	56 - 100	0.5 to 0.8

2.5 Purlin installation



PURLIN BOX INSTALLATION

FIGURE 2

NOTE: If a 'single-motor' belt driven roof unit (BSM, BVM, BSC or BVC) is mounted on a sloping roof, the unit should be orientated such that the motor is towards the apex of the roof, and the drain holes are at the low point to allow condensation to drain away.

2.5.1 A purlin type installation may be used on sloping roofs of up to a maximum of 30 degrees from horizontal. The assembly comprises a purlin box on which is seated the roof unit. The assembly is fitted over a pre-prepared purlin/trimmer construction that forms an aperture in the building roof. To install the assembly proceed as follows using the fixings provided, and adjust the shutter springs if necessary as detailed in Paragraph 2.8.

- 2.5.1.1** Refer to Figure 2 and assemble the four sides of the purlin box keeping the small overlap on the outside of the adjacent side. Secure the assembly using the eight 16mm x M6 or M8 screws with their plain washers and 'Binx' nuts provided.
- 2.5.1.2** If a soaker sheet is to be used check before proceeding further to ensure that the soaker sheet will fit over the purlin box.
- 2.5.1.3** Fit the purlin box to the roof using the lindaptors, spreader plates and fixings supplied (see Figure 3).
- 2.5.1.4** Fit the soaker sheet (if being used) to the roof.

- 2.5.1.5 Assemble the four extrusion side border sections to the purlin box using the 16mm x M6 screws. The nuts are held captive on the extrusion side border sections.
- 2.5.1.6 Fit the roof unit skirt to the purlin box using the 20mm x M8 screws. It is important to ensure that the M8 Dubo sealing washers are used between the screw heads and the skirt. Do not overtighten as this may damage the skirt. The nuts are held captive on the side border extrusions.

2.6 Curb installation

- 2.6.1 **A curb type installation is preferable for a roof unit fitted to a flat roof.** Place the unit on the curb and secured it along its edge using the 3/8" diameter x 2.5" long coach screws and M10 Dubo sealing washers supplied. **Do not overtighten the coach screws** as damage may occur. A typical example of a curb mounted roof unit installation is shown on Figure 4. If the forming of a curb is difficult, not convenient, or if a curb is required on a sloping roof; then a metal upstand (steel curb) is available from Fläkt Woods Limited. Where the metal upstand is used the following fixings will be required and must be obtained by the installer: M8 x 35mm stainless steel screws with sealing washers to secure the roof unit skirt to the upstand, and M8 x 20mm stainless steel screws with lockwashers to secure the upstand to the roof. All fixings must be of a length to provide a safe and secure fixture, and sealing washers should be used where appropriate to provide a water tight seal between the component parts of the assembly.
- 2.6.2 The type DPI roof unit (based on the DSP roof unit but with no shutters fitted) is designed to draw air into an area without the use of, or with very little, ducting. The DPI unit is fitted in a similar manner to the curb mounted DSP unit (see Figure 4).

2.7 Wall mounted installation

- 2.7.1 **A conversion kit is required to allow the DSP, DSM and DSC roof units to be wall mounted.** The kit comprises a wall adaptor and a louvre shutter kit, and is available from Fläkt Woods Limited. When converted, the roof units assume the identity WDP, WDM and WDC respectively (see Figure 5).

2.8 Shutter spring adjustment

- 2.8.1 When BVM, DVM, BVC or DVC roof units are mounted on a sloping roof, adjustments are required to the springs of the upper and lower shutters. The springs of the shutters at the lower end of the roof should have their tension increased whilst those at the top end should have their tension decreased. The tension is altered by moving the springs from their normal position 'B', to position 'A' to decrease the tension and, to position 'C' to increase the tension. Shutters that have their pivots running up the slope of the roof require no adjustment, i.e. the spring must remain in position 'B'.
 - NOTE 1:** When the DVP roof unit is mounted on a pitched roof the two shutter pivots must run up the slope of the roof and point toward the roof apex.
 - NOTE 2:** To gain access to the shutter springs of some of the smaller roof units it may be necessary to remove the cowl.
- 2.8.2 When DSP, DSM, DSC, BSM and BSC roof units are mounted on a sloping roof (above 30°) a recommended spring tensioning plate assembly should be fitted between the lower shutter, and the adjacent shutter pivot rod, to ensure correct shutter operation.

3 ELECTRICAL INSTALLATION AND OPERATION

WARNING: THE ROOF UNIT CONTAINS ROTATING PARTS AND ELECTRICAL CONNECTIONS WHICH CAN BE A DANGER AND CAUSE INJURY. IF THERE IS ANY DOUBT THAT A SAFE AND RELIABLE INSTALLATION OF THE EQUIPMENT CAN BE ASSURED; Fläkt Woods Limited HEAD OFFICE OR THEIR REPRESENTATIVE SHOULD BE CONTACTED FOR ADVICE.

IF THE FAN STOPS DUE TO AN OVERHEAT SITUATION, THE OVERHEAT PROTECTION DEVICE (IF FITTED – SEE PARAGRAPH 3.6) MAY RESET AS THE TEMPERATURE COOLS AND AUTOMATICALLY RESTART THE FAN IF POWER IS STILL APPLIED.

EAR DEFENDERS SHOULD BE WORN IN THE VICINITY OF OPERATING FANS.

3.1 Electrical connections

- 3.1.1** All wiring must be in accordance with local regulations. To allow for safe maintenance the mains electrical supply should be connected to the roof unit via a lockable integral isolator switch (see Paragraph 3.5) or via a lockable isolator switch fitted separately from the roof unit by the installer. The supply should be routed to the isolator from an external, clearly marked and accessible ON/OFF switch by a competent person. The cables at the roof unit should be long enough to allow the unit to be lowered for connection/disconnection and to allow movement of the roof unit on its resilient mountings. Before connecting the power supply to the unit refer to the relevant cross-referenced diagram listed below for specific wiring information:
- a) single-phase belt-driven motor, isolator fitted – see Figure 6(a),
 - b) single-phase direct-driven BT/CT type motor – see Figure 6(b),
 - c) single-phase direct-driven motor with speed controller – see Figure 6(c),
 - d) three-phase motor, isolator fitted – see Figure 6(d),
 - e) three-phase direct-driven BT/CT type motor – see Figure 6(e),
 - f) three-phase direct-driven motor, transformer type speed controller – see Figure 6(f),
 - g) three-phase direct-driven motor, electronic type speed controller – see Figure 6(g),
 - h) three-phase direct-driven motor with change-over switch – see Figure 6(h),
 - i) All other motors – refer to data inside terminal box.
- 3.1.2** Fans with a **duct-mounted** terminal box must have their electrical supply fed through an entry point in the side of the box. Unused entry points must be sealed with weatherproofed plugs or grommets.
- 3.1.3** Fans with a **motor-mounted** terminal box also have the electrical supply fed through an entry point in the side of the box. The cable must be threaded through a gland assembly, and the gland assembly should be tightened sufficiently to hold the cable and provide a weatherproof seal.
- 3.1.4** Wiring details for roof units with flameproof motors are contained in Paragraph 3.2.
- 3.1.5** A suitable earth should be connected to the earth screw on the motor, and also to the roof unit integral isolator switch (if fitted – see Paragraph 3.5).

3.2 Roof units with flameproof motors

- 3.2.1** Roof units with flameproof motors are designed for use in locations where there are liable to be fumes, dust or flammable/explosive gases. Installation should be carried out in accordance with BS EN 60079-14 by qualified installers. Special care must be exercised when electrically connecting such units to ensure that the thread of cable glands, or conduit, matches the thread into which it is screwed in order that the entire installation achieves the flameproof barrier required. A stopper barrier box where fitted, must be filled with a barrier compound when the connections have been made. Any electrical control gear must be located outside the hazardous area if it is not of a flameproof type. The motor should not be allowed to become coated with dirt/dust, etc. which could restrict surface cooling and consequently raise the temperature of the motor carcass.

3.3 Circuit protection

- 3.3.1** Fuses in the fan electrical control circuit must be sufficiently rated to carry the starting current as indicated on the motor nameplate, and they should be regarded as only protecting the wiring against the effects of short circuits or earth faults. The fuses are not suitable for overload protection. To provide full protection for the motor, a starter panel with overload protection must be used, and an isolator switch must be incorporated into the circuitry.

3.4 Capacitors (single-phase motors only)

- 3.4.1.** Low rated capacitors are mounted on the motor during manufacture. Larger rated capacitors, are supplied separately and must be fitted externally from the motor. Capacitors for flameproof motors must be located outside the hazardous area.

3.5 Isolator switch

- 3.5.1.** Roof units fitted with a recommended integral isolator switch must be wired directly to the switch via an external and accessible ON/OFF switch. On the BSM, BSC, BVM and BVC (belt-driven) roof units the isolator switch is mounted on the motor mounting plate that is accessible by removing the unit top cover. The isolator switch in the belt driven units must be considered as a **secondary** isolating device only; a **primary** switch must be fitted separately as part of the installation to ensure that the roof unit can be switched off at ground level before the roof unit is approached. On the DSP, DSM, DSC, DVP, DVM, DVC roof units the isolator switch is fitted inside the unit skirt for transit purposes only, and will need to be repositioned before installation. Isolator switches are **not** fitted to roof units with flameproof motors.

3.6 Overheat protection

- 3.6.1.** Motor overheat protection is fitted as standard on most single-phase motors and is optional on three-phase motors. Overheat protection is achieved by the use of either thermostats or thermistors. The protection devices are wired in either of the following two ways:
- 3.6.1.1** on 3-phase motors, and single phase motors with a full load current **above** 6.3A, thermostats/thermistors (if fitted) are wired to separate motor terminals in order that they can be used to form an external overheat protection circuit. When this form of protection is applied, the link between terminals K and UZ on single-phase motors must be removed.
 - 3.6.1.2** on single-phase motors with a full load current of **below** 6.3A, thermostats (if fitted) are wired within the motor to automatically open circuit the windings and stop the fan in an overheat situation (see Paragraph 3 Warning).

3.7 Switch on

- 3.7.1.** **Before** switching on confirm that the electrical supply is fully compliant with the requirement of the motor as detailed on the motor nameplate, that the roof unit is correctly installed, all component parts and fixings are secure, safety guards are in place and no loose articles are present in the vicinity. A trial connection of the **three-phase supply** should be made to check that the fan rotates in the required direction. If the rotation is incorrect interchange any two phases of the incoming supply at the terminal block. If after correctly connecting the **single phase supply** the fan is found to be rotating in the wrong direction, the motor winding leads U1 and U2 should be interchanged at the motor terminal block. Immediately on switch-on ensure that the unit shutters open correctly, check the assembly for smooth, low-vibration running, and check that the current consumption is within the full load current specified on the nameplate.

4 MAINTENANCE

WARNING: BEFORE ATTEMPTING ANY MAINTENANCE SWITCH OFF AND COMPLETELY ISOLATE THE ROOF UNIT AND ITS CONTROLS FROM THE ELECTRICAL SUPPLY AND FROM THE SEPARATE ANTI-CONDENSATION HEATER (IF FITTED) SUPPLY, AND ALLOWING THE ROTATING PARTS OF THE FAN TO COME TO REST.

BEFORE ENTERING THE AREA ENSURE THAT ALL FUMES, DUST, TOXIC EMISSION, HEAT ETC., HAVE DISPERSED FROM THE LOCAL ENVIRONMENT, AND THE FAN BLADES ARE NOT LIKELY TO WINDMILL.

ALL LIFTING AIDS USED DURING MAINTENANCE, AND ALL LIFTING POINTS UTILISED, SHOULD BE CERTIFIED TO CARRY THE WEIGHT OF THE EQUIPMENT BEING LIFTED.

ALWAYS WEAR APPROPRIATE PROTECTIVE CLOTHING WHEN WORKING IN THE VICINITY OF THE FAN ASSEMBLY.

EAR DEFENDERS MUST BE WORN IN THE VICINITY OF OPERATING FANS.

NOTE: The maintenance procedures are designed to keep the roof unit safe, operational and fault-free.

4.1 General

- 4.1.1** A regular routine maintenance schedule should be established, and a record kept. Maintenance must be carried out by a competent person with appropriate skills using the correct tools and equipment. A list of recommended maintenance intervals is given in Table 1. Where the environment is particularly dirty, hazardous or open to weather extremes a reduction in the intervals may be necessary as experience dictates. Internal and external fan surfaces may be cleaned with low pressure clean water and non-abrasive additives
- 4.1.2** When examining and checking the security of fixings during routine maintenance, those fixings that have locking devices fitted or are painted over, need not be disturbed if they can be seen to be secure. Any locking devices that are disturbed during maintenance must be discarded and replaced with identical devices. If in doubt about the tightness of any fixings contact Fläkt Woods Limited for advice.
- 4.1.3** In addition to routine maintenance, sealed for life motor bearings should be replaced during a maintenance period dictated by the amount the unit is in operation (see Paragraph 5). If extended lubricators are fitted, grease should be periodically applied in accordance with the instructions on the fan or motor nameplate. A compatible grease type must be used. It is essential that every trace of water and dirt is removed from around the grease point and that a clean grease gun is used. Only a low pressure should be needed to inject the specified quantity of grease. If high pressure is required, the cause should be investigated. Grease points are generally located in the region of the duct terminal box, or on the motor end covers.
- 4.1.4** After maintenance ensure that no loose articles are present in the vicinity of the fan and that the fan and guards are properly secured into their original location.

4.2 Infrequent Use

- 4.2.1** If the fan assembly is to be used less frequently than once a month the following additional maintenance procedures should be carried out, and a record kept:
- 4.2.1.1** the resistance of the motor windings to earth, should be measured (at 500V d.c) each month. If any reading is less than ten megohms, the motor should be dried, and re-checked, before running the motor.
 - 4.2.1.2** the roof unit should be operated for at least fifteen minutes each month, to ensure correct lubricant conditions in the bearings.
 - 4.2.1.3** if an anti-condensation heater is fitted, check each month that it is automatically switched on (drawing its rated current) when the motor is switched to **off**.

5 OVERHAUL/EXTENDED MAINTENANCE

- 5.1** Advice on roof unit overhaul procedures, bearing replacement, motor replacement, motor rewinding, spare parts, etc., is available from Fläkt Woods Limited service centre in Colchester.
- 5.2** Direct driven motors that run at a speed of less than 1800 rpm, and have sealed for life bearings, should be dismantled after 30,000 hours of operation (or every 5 years whichever comes sooner), and the bearings should be replaced. Motors that run above 1800 rpm, and have with sealed for life bearings, should be dismantled after 20,000 hours of operation (or every 2.5 years whichever comes sooner), and the bearings should be replaced. Belt driven motors (BSM, BVM, BSC or BVC) should have their motor bearings and central shaft bearing replaced after 30,000 running hours, and their drive belts should be replaced every two years.
- 5.3** Consideration should be given to a major overhaul of the roof unit after an operating period of 50,000 hours. The overhaul should include replacing the bearings and rewinding the motor to its original specification.
- 5.4** After overhaul/extended maintenance the roof unit must be correctly installed back into its original position in accordance with this document. The unit should be switched on and checked in accordance with Paragraph 3.7

6 FAULT FINDING

NOTE: The routine maintenance procedures detailed in Paragraph 4 and Table 1 of this document are designed to keep the roof unit operational and fault free. If a starting fault occurs carry out the electrical checks detailed below, if an operating fault occurs carry out the mechanical checks.

6.1 Electrical

6.1.1 Check that the electrical connections to the unit are secure.

6.1.2 Check that the voltage applied to the unit is as specified on the motor nameplate.

6.1.3 Connect an ammeter in line with each phase (one phase in the case of single phase motors) of the motor in turn and check that the current consumption is within the full load current specified on the motor nameplate. Check that the supply voltage at the fan terminals is as expected and is balanced.

6.1.4 Measure each motor winding to earth, and between each winding, using a 500V d.c insulation tester. If the reading is less than ten megohms the reason is liable to be dampness in the motor. To dry the motor place it in a warm (typically 40 degrees centigrade) dry airstream and regularly monitor the motor until the insulation reading is restored to ten megohms or greater.

6.1.5 Ensure that there is no smell of burnt insulation in the vicinity of the motor.

6.2 Mechanical

6.2.1 Check that there is no obstruction to the motor impeller blade and no loose articles or debris in the vicinity.

6.2.2 Rotate the motor shaft by hand. Investigate any sound of internal chaffing, rubbing or stiffness. Any stiffness may indicate that the bearings require lubrication or replacing.

6.2.3 On belt driven units check that the belt is not broken or slipping.

7 DISPOSAL

On disposal of the roof unit, the metal components of the fan/motor should be segregated and separately recycled. The following items should be safely disposed of in accordance with local health and safety regulations:

- electrical lead coverings,
- motor winding insulation materials,
- bearing lubricant,
- motor/fan terminal block,
- paintwork,
- plastic parts,
- packing materials,
- silencer infill (Note that a face mask and gloves should be worn when handling the infill. If the infill is particularly dry or is damaged it should be damped-down before disposal).

REGULAR MAINTENANCE SCHEDULE	EVERY 3 MONTHS	EVERY 6 MONTHS	EVERY 12 MONTHS	COMMENTS
1. Examine motor cooling fins/carcase.	*			Remove any material/dirt build-up between fins.
2. Examine impeller for dirt build-up and for damage.	*			Clean or replace the impeller. Check that the running clearance between the impeller and its surround is adequate.
3. Check tension of motor drive belt(s) (if applicable).	*			Adjust belt tension as detailed in Paragraph 2.4.
4. Remove the motor and terminal box drain plugs (if fitted see Paragraph 2.2).	*			Allow condensation to drain away. Refit drain plugs if required.
5. Check operation of roof unit shutters.		*		Ensure shutters are clean and that they open and close easily.
6. Examine condition and security of safety guards and safety harnesses.		*		Clean safety guards and harnesses. Replace them if there are any signs of damage.
7. Examine tightness of roof unit to roof fixings.			*	Tighten as necessary to ensure a safe and secure fit.
8. Check security of roof unit and fan component parts. (see Paragraph 4.1.2)			*	It is essential to confirm that all fixings of the roof unit and its fan are tight and fully driven home. Torque ratings for the motor and impeller fixings are listed in Table 2. If in doubt about the tightness of any fixings contact Fläkt Woods Limited for advice.
9. Check motor voltage and current consumption.			*	Ensure readings are as per nameplate data.
10. Lubricate bearings.				See Paragraph 4.1.3.

TABLE 1: ROUTINE MAINTENANCE PROCEDURES

TORQUE:				
FIXING SIZE:	INTO STEEL (Nm):	INTO CAST ALUMINIUM (Nm):	INTO CAST IRON (Nm):	INTO IMPELLER (Nm):
M6	12	7	3	6
M8	28	14	7.5	15
M10	55	28	15	30
M12	100	50	25	50
M14	155	85	40	-
M16	245	135	60	120
M18	335	-	85	-
M20	475	200	120	-

TABLE 2: TORQUE SETTINGS

PURLIN MOUNTINGS ON PITCHED ROOF.
NOTE: TRIMMERS NOT SUPPLIED.

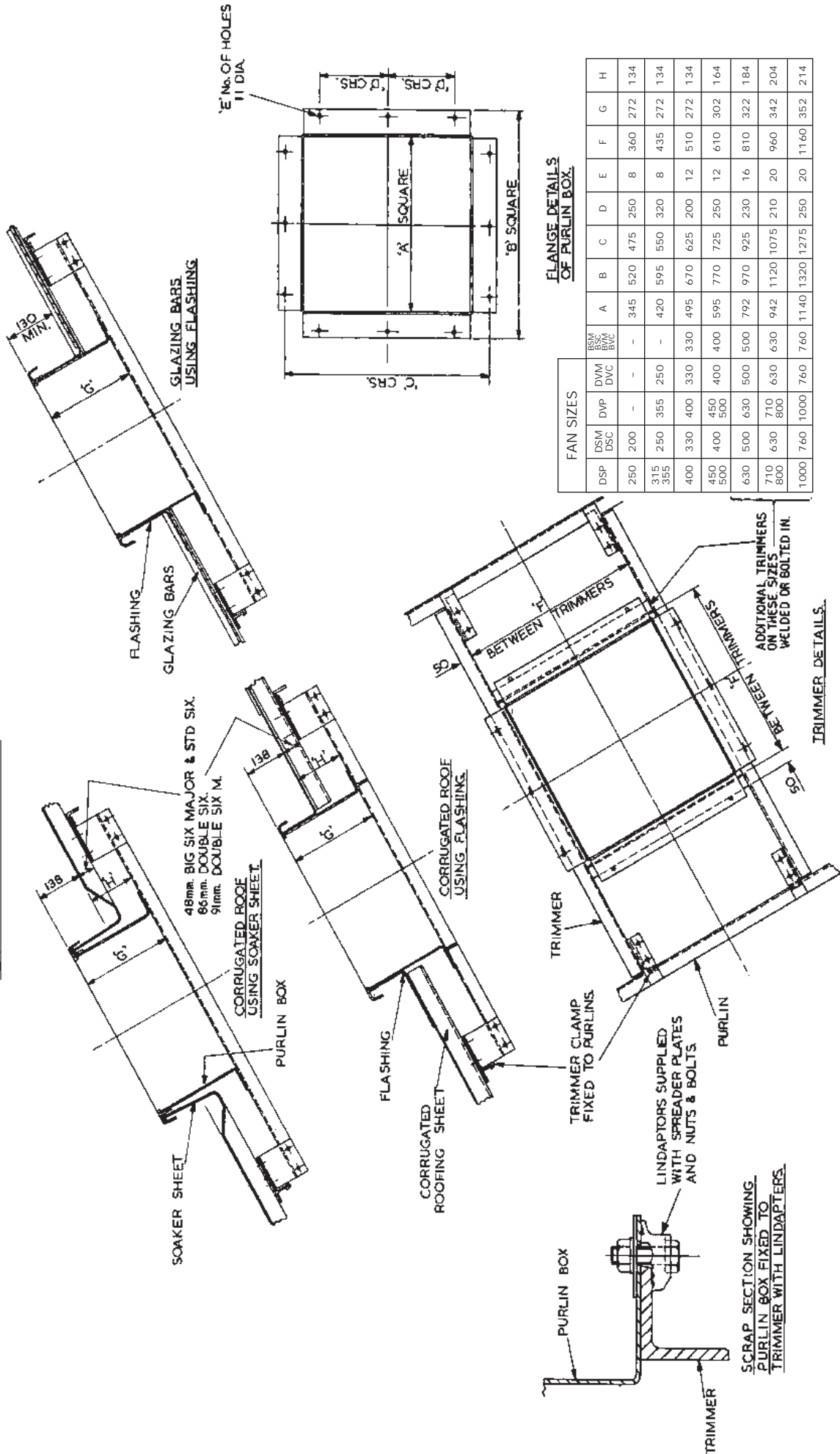
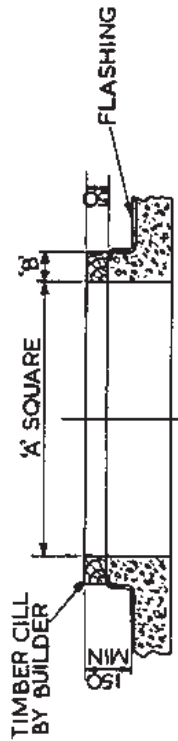
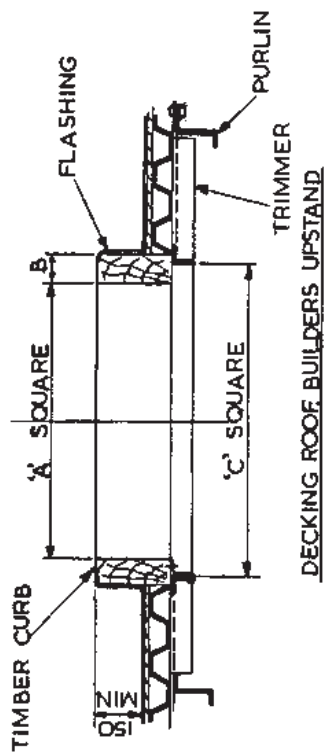


FIGURE 3

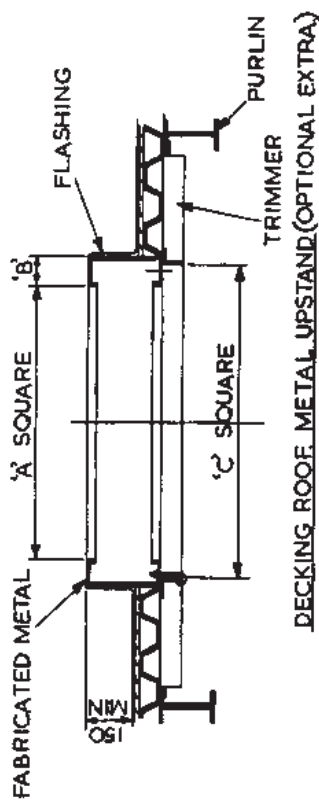
TYPICAL PURLIN INSTALLATION: DSP, DVP, DSM, DVM, DSC, DVC, BSM, BVM, BSC AND BVC ROOF UNITS



CONCRETE ROOF

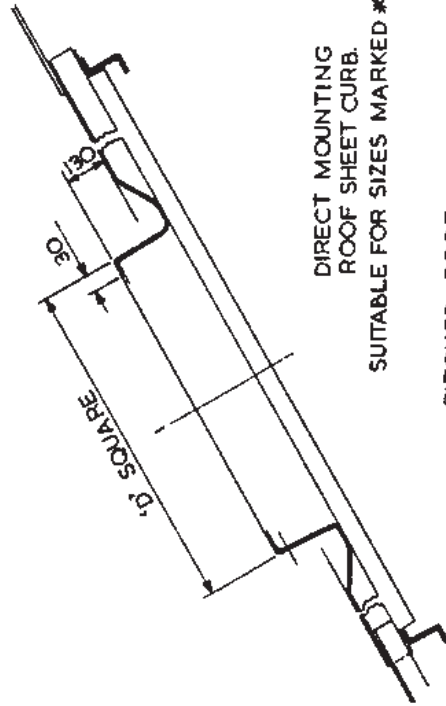


DECKING ROOF BUILDERS UPSTAND



DECKING ROOF METAL UPSTAND(OPTIONAL EXTRA)

FLAT ROOFS



DIRECT MOUNTING ROOF SHEET CURB.
SUITABLE FOR SIZES MARKED * ONLY

PITCHED ROOF.

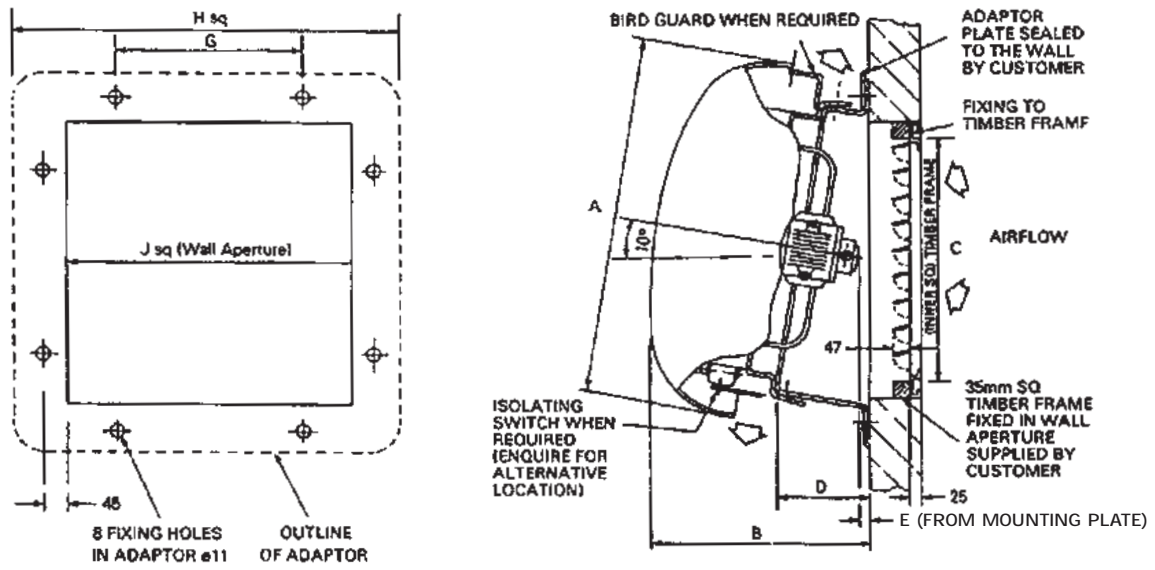
FAN SIZES		BSM BVM BVC					
DSP	DSM DSC	DVP	DVM DVC	A	B	C	D
250	200	-	-	250	75	325	426
315 355	250	355	250	4325	75	400	500
400	330	400	330	400	75	475	576
450 500	400	450 500	400	500	75	575	676
630	500	630	500	700	75	775	-
710 800	630	710 800	630	9800	100	900	-
1000	760	1000	760	1000	100	1100	-

DIRECT MOUNTING ROOF SHEET NOT USED WITH BSM, BSC, BVM & BVC TYPES.

CURB MOUNTING.

FIGURE 4

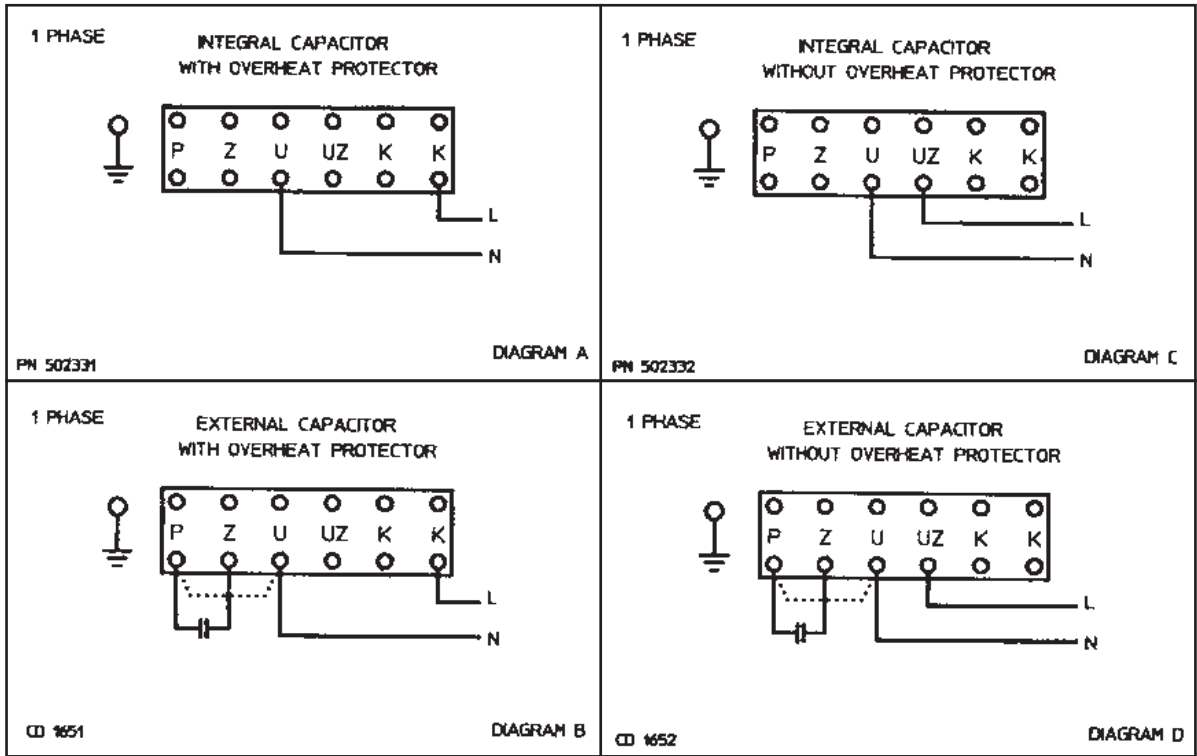
TYPICAL CURB INSTALLATION: DSP, DVP, DSM, DVM, DSC, DVC, BSM, BVM, BSC AND BVC ROOF UNITS



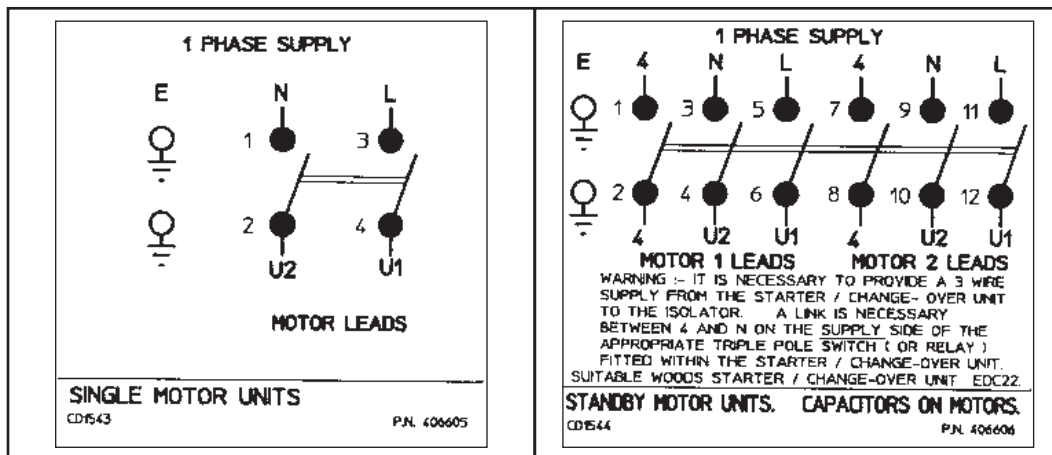
Fan Size	A	B	C	D	E	G	H	J	Weight (Wall Adaptor) kg
WDP 250 WDM 200 WDC 200	480	347	285	168	5mm MAX PROJECTING	270	600	355	2.4
WDP 315/355 WDM 250 WDC 250	600	383	385	181	5mm MIN RECESSED	310	670	455	2.8
WDP 400 WDM 330 WDC 330	710	435	435	194	18mm MAX PROJECTING	350	750	505	3.4
WDP 450/500 WDM 400 WDC 400	820	495	535	212	12mm MAX PROJECTING	400	850	605	4.0

FIGURE 5

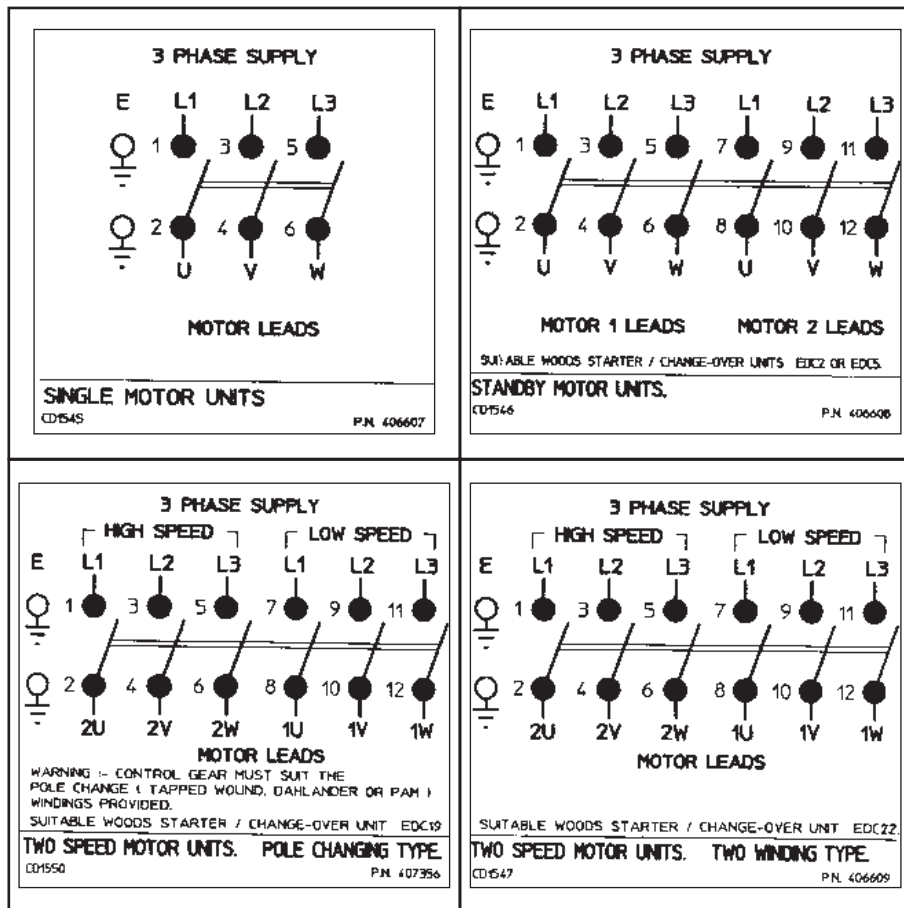
WALL MOUNTED INSTALLATION:
WDP, WDM AND WDC ROOF UNITS



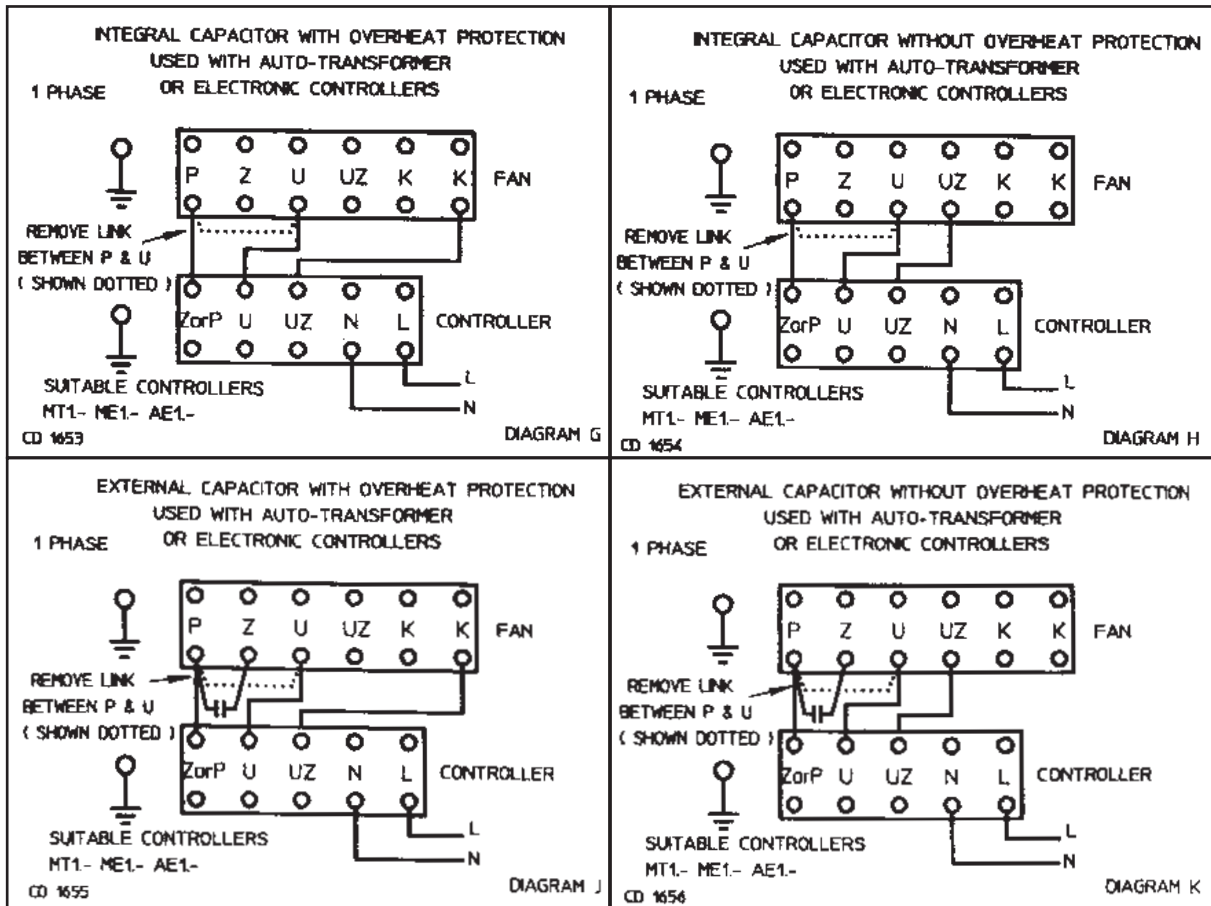
WIRING DETAIL (SINGLE-PHASE DIRECT-DRIVEN BT/CT TYPE MOTOR)
FIGURE 6(b)



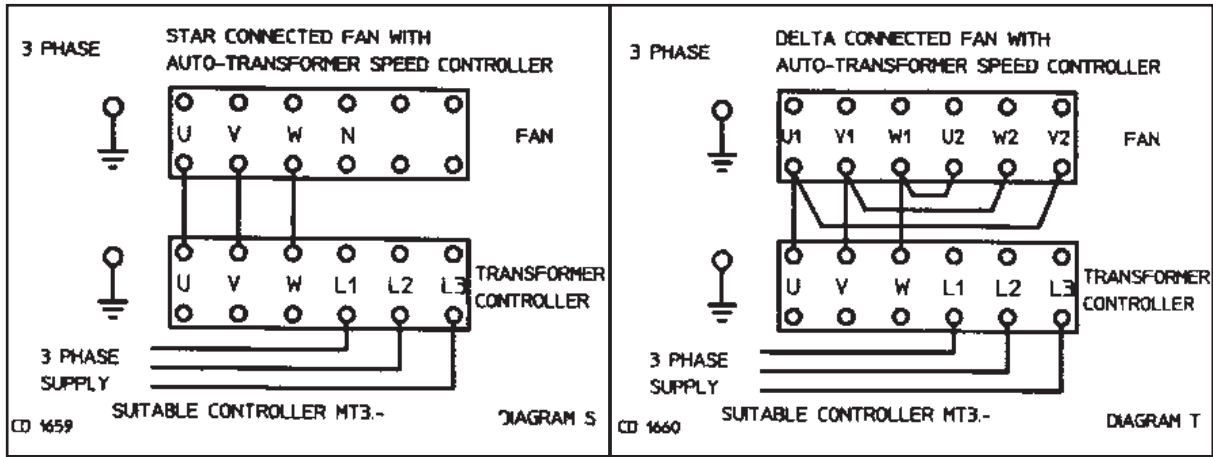
WIRING DETAIL (SINGLE-PHASE BELT-DRIVEN MOTOR, ISOLATOR FITTED)
FIGURE 6(a)



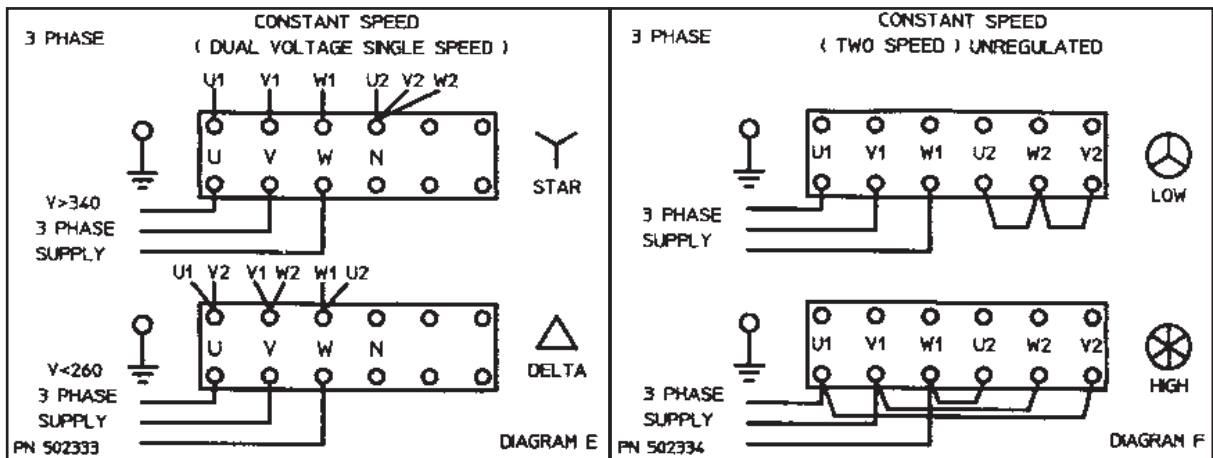
WIRING DETAIL (THREE-PHASE MOTOR, ISOLATOR FITTED)
FIGURE 6(d)



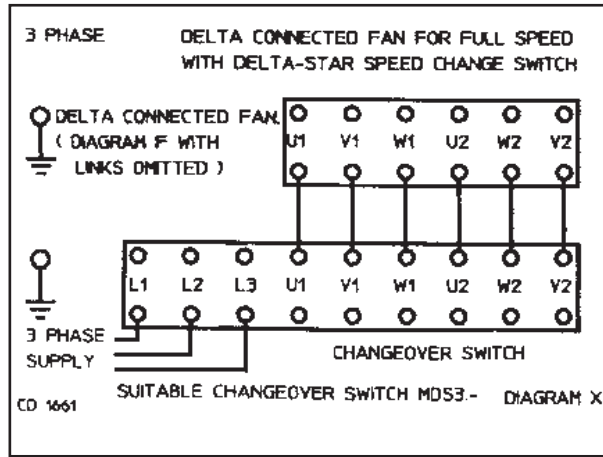
WIRING DETAIL (SINGLE-PHASE DIRECT-DRIVEN MOTOR WITH SPEED CONTROLLER)
FIGURE 6(c)



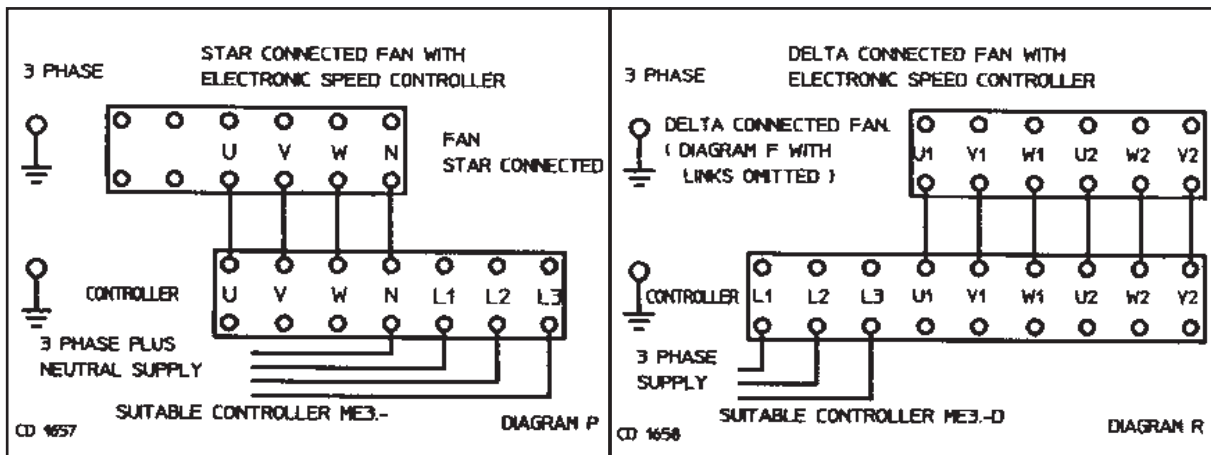
WIRING DETAIL (THREE-PHASE DIRECT-DRIVEN MOTOR, TRANSFORMER TYPE SPEED CONTROLLER)
FIGURE 6(f)



WIRING DETAIL (THREE-PHASE DIRECT-DRIVEN BT/CT TYPE MOTOR)
FIGURE 6(e)

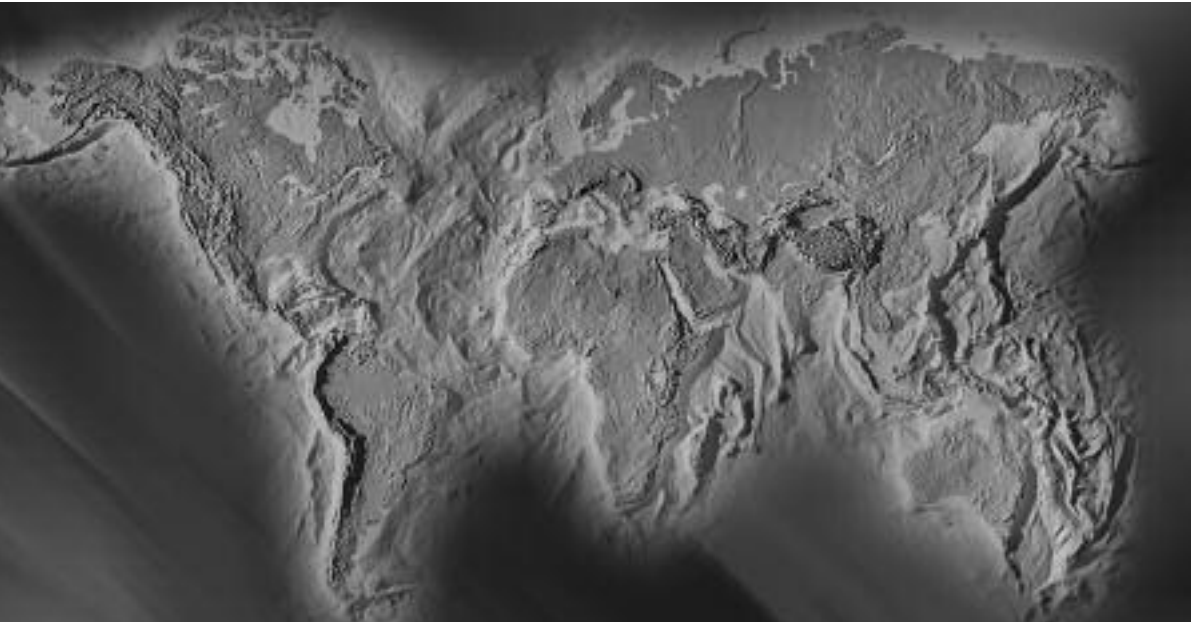


WIRING DETAIL (THREE-PHASE DIRECT-DRIVEN MOTOR WITH CHANGE-OVER SWITCH)
FIGURE 6(h)



WIRING DETAIL (THREE-PHASE DIRECT-DRIVEN MOTOR, ELECTRONIC TYPE SPEED CONTROLLER)
FIGURE 6(g)

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