Woods
AIR MOVEMENT

INDUSTRIAL EC COOLING FAN

Safety, installation and maintenance instructions

Part Number 923707

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STANDARD VENTILATION FANS

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THIS LEAFLET MUST BE PASSED TO THE USER
TO ENABLE THE FAN TO BE MAINTAINED IN A SAFE CONDITION.

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TO ENABLE THE FAN TO BE MAINTAINED IN A SAFE CONDITION.

1. SAFETY

Warning and safety information relevant to specific operations are contained within each section. The following warning or advice categories are used:

DANGER! Failure to follow these instructions may result in serious injury or death to the user in addition to serious damage to the equipment.

WARNING! Failure to follow these instructions may result in minor injury or damage to the equipment.

CAUTION! Failure to follow these instructions may result in malfunction or damage to the equipment.

NOTE! Additional instructions to consider.

2. INTRODUCTION & PURPOSE - GENERAL

The Climafan with integrated Power Drive System is a highly efficient air movement product, designed to operate within a temperature range of -25° to +55°C (some motors can operate at -40°C, but cold start within the range of -30°C to -40°C is not allowed). When operating at low temperatures, ice formation on the fan assembly must be prevented. It is equipped with various safety and protection functions like, locked Rotor detection, phase failure detection, over current protection, over and under voltage protection, etc.

Each fan assembly has been manufactured specifically to fulfil the requirement of the installation for which it was designed. No deviation from the original requirement must be implemented without referring to Woods Air Movement head office (located in Colchester, UK). Any queries regarding safety or operating problems must be referred to your local Woods Air Movement office, sales centre or representative, together with full fan/motor nameplate details. Should a fan failure occur whilst the product is under warranty, the Woods Air Movement service centre in Colchester must be contacted before any repair work is undertaken.

DANGER! Only approved, qualified personnel familiar with the assessment of hazards and risks associated with fans, and with the use of tools and test equipment required to service such 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 safe and reliable installation, operation, and maintenance of the equipment can be assured, Woods Air Movement or their representative must be contacted for advice.

CAUTION! The motor should not be removed from the product or modified in any way.

3. INSPECTION, STORAGE & HANDLING

WARNING! When storing fan assemblies, please ensure that access by unauthorised personnel is prevented by using guards, barriers, or secure premises, so that fan impellers, which may be rotating (wind milling), do not present a hazard.

Check immediately on receipt that the fan is as ordered and that it has not been damaged in transit.

Where the fan is delivered in a crate (or similar) the crate must be considered as a protective device for transit only.

The crate must not have other equipment stacked on top of it and it must not be stacked on top of other equipment. The crate structure must not be used as a lifting aid, unless otherwise indicated.

Where a fan is packed inside a crate, a fork-lift truck or similar must be used to transport the product. The fan must be stored in a safe, clean, dry, vibration free location. Each month, the fan impeller should be given a manual rapid spin to help prevent grease from hardening and possible bearing brinelling.

When dismantling the crate to gain access to the fan assembly care must be taken to avoid injury from sharp edges, nails, staples, splinters, etc. If the fan is to be stored for 12 months or more, then the activities described in Section 6.2 should be carried out.

It is highly recommended that the fan is inspected by a member of the Woods Air Movement service team before commissioning is undertaken.

4. MECHANICAL INSTALLATION

DANGER! It is recommended that suitable safety guards form part of the installation. Advice on these, and similar safety devices, are available from Woods Air Movement.

WARNING! Where the fan 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 unless clearly indicated otherwise.

All lifting aids used during installation must be appropriately certified to carry the weight of the equipment being lifted.

The correct protective clothing (including hard hats, eye protectors and ear defenders) should always be worn when working with and in the vicinity of the fan assembly.

During lifting of the fan all personnel must be clear of the area below and around the suspended fan.

NOTE! Before fan assembly installation, check that no damage has occurred in transit, that there is no fan casing deformation, that the impeller rotates freely and that the fan and motor nameplate data complies with its required use. If the fan assembly has been stored for longer than a month please refer to Section 6.2

Fan assemblies can sometimes be very heavy (depending on fan and motor size and any attached ancillary equipment), which can make them unwieldy during handling. They must therefore be lifted slowly to prevent damage or distortion. Proper precautions must be taken, and certified lifting aids used, to ensure that the fan is well supported and stable before lifting into position. Care must be taken when installing fans to ensure that the product orientation is correct in relation to direction arrows which indicate direction of air movement and impeller rotation direction.

Flange holes or mounting feet holes can be used for lifting but more than one hole must be used to spread the load. If special lifting points are provided, they must be used. The fan must be installed such that it is correctly positioned in accordance with the required airflow direction. An airflow indication arrow is shown on the fan nameplate.

Sharp bends in the ductwork close to the fan must be avoided. Adequate room must be allowed around the fan for inspection and maintenance. When ancillary component parts are included in the fan assembly, such as anti-vibration mounts, silencers, bellmouths, air operated dampers, flexible connectors (and their clips), weather proofing, platforms, supports, chains, and harnesses, etc. they must be fully aligned before being bolted together so that no distortion or stress is placed on the equipment. **Air operated dampers must be installed downstream of the fan (on the fan discharge) to ensure that fan performance is not adversely impacted.**

The fan mounting and support structure must be strong and rigid enough to take the weight and operating forces of the fan and any other weight applied during installation. Consideration must be given to mitigation of vibration transmission. If vibration isolators are used they must be appropriate for the weight and thrust of the fan and must not be used to compensate for misaligned component fixing points. If any component parts do not easily fit together the root cause must be investigated and rectified.

After installation all packing materials must be disposed of in accordance with the instructions advised in Section 9.

5. ELECTRICAL INSTALLATION & OPERATION

DANGER! Before any work can be attempted, the fan assembly, and all controls must be completely isolated from electrical supplies. Ensure that rotating parts are fully at rest.

The fan assembly contains rotating parts and electrical connections which can be a danger and cause injury. Ensure that rotating parts are fully at rest. If there is any doubt that a safe and reliable fan installation can be achieved Woods Air Movement or their representative must be contacted for advice

The motor can cause serious electric shock even after the mains supply is switched off. Always wait for at least three minutes after switching off the device before installation, maintenance or repair.

In case of malfunction, a qualified technician should check the DC-link for charge or wait for at least an hour before dismantling the motor for repair.

The motor must always be earthed via the mains safety earth connection. The protective earthing conductor shall comply with the local safety regulations for high protective earthing conductor current equipment.

WARNING! Before entering the area where the fan is installed, please ensure that all fumes, dust, toxic emissions, heat etc. have dispersed from the local environment, and that the fan blades are not likely to rotate.

The housing of the unit is also used as a heat sink and hence can become hot. Take appropriate precautions before touching.

This product causes a DC current in the protective conductor. Where a residual current device (RCD) is used for protection in case of direct or indirect contact, only a Type B RCD is allowed on the supply side of this product. Use RCD of 300 mA minimum.

Always wear appropriate protective clothing (including hard hats, eye protectors and ear defenders etc.) when working in the vicinity of the fan assembly.

CAUTION! In order to comply with the EMC Directive, it is absolutely necessary to follow the installation instructions.

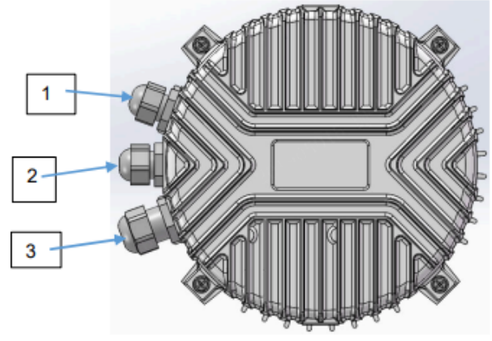
Do not carry out voltage tests (Megger) on the unit as doing so will permanently damage the internal electronic components.

Never disregard an alarm. Always check and remedy the cause of an alarm. Please seek Woods Air Movement for further advice.

NOTE! To ensure the waterproof capability of the EC Motor, please do not disassemble the motor glands or the controller.

The fan does not come with a terminal box and electrical connections to the fan must be made with loose motor cables. Viewed from the non-driven/controller end of the motor and with the cable glands on the left-hand side, three cables are:

1. Signal Cable
2. Fault Output Cable
3. Three-phase Cable



The electrical supply and electrical earthing must be connected by a qualified and competent electrician. The installer must not disassemble the motor controller.

Sufficient cable length must be ensured to allow for movement of the fan on its mountings.

A connection diagram providing wiring details is supplied with all fan assemblies. See Figure 1 on page 9 for wiring details.

Electrical control circuit fuses must be correctly selected to carry the rated starting current as indicated on the motor or fan nameplate but should only be regarded as offering protection against wiring short circuits or earth faults. Fuses are not designed to provide overload protection.

Although the connections for the control signals and the switches are isolated from the mains supply voltage, do not touch the control or power terminals when the unit is switched on.

5.1 POWER CONNECTION

A 3-phase electrical supply is to be connected to the cables labelled L1, L2 and L3 from the motor. The device has to be earthed using the cable labelled PE. Solid or stranded 2,5mm^2 copper wire is recommended for the electrical supply.

The device must be powered with a 50/60 Hz, 3 phase 380-480V AC supply.

DANGER! Do not reverse the PE wire and the live wire. If they have been reversed, please cut off the power supply immediately. And during this period, do not touch the motor and the casing of motor because at this time, there is a fatal voltage on the casing.

WARNING! Do not power the device with a Variable Speed Drive (or any similar device) as this can permanently damage the internal electronic components.

The device must be earthed using the conductor labelled PE.

The minimum size of the protective earthing conductor shall comply with the local safety regulations for high protective earthing conductor current equipment.

The 3 phase power input must be protected with a maximum 16A gG type according to IEC 60269

or a C16A automatic circuit breaker with similar characteristic must be used.

An isolator switch must be incorporated into the power supply. The isolator switch should be a lockable type that will allow the operator/maintainer to isolate the fan from the electrical supply before working on the assembly.

Make sure that the power supply is suitable for the voltage & frequency shown on the nameplate.

NOTE! The mains power supply cable can be a normal NON shielded cable. A shielded cable is not required under European EMC regulations. Armoured cable can be used for mechanical protection if needed.

Changing the phase sequence of supply will not change the rotation of the motor.

Motor can not be supplied with a 3-phase 220V or 575V electrical supply.

5.2 CONTROL/RELAY CONNECTIONS

NOTE! The control signal cable section uses shielded cable and single-point grounding has been completed inside the motor. Therefore, please do not operate the shielding part at the user operation end. Double-point grounding may cause damage to the controller part in some cases. If you have any questions about the operation of the signal cable, please contact Woods Air Movement.

Please do not connect the 10V outputs from multiple devices to each other.

Please use the COM of the relay itself when using the COM of the faulty relay. it is prohibited to use GND of the signal interface or PE on the power side when using NO or NC.

Specification for control signal inputs/outputs and output supply:

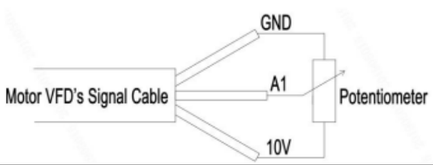
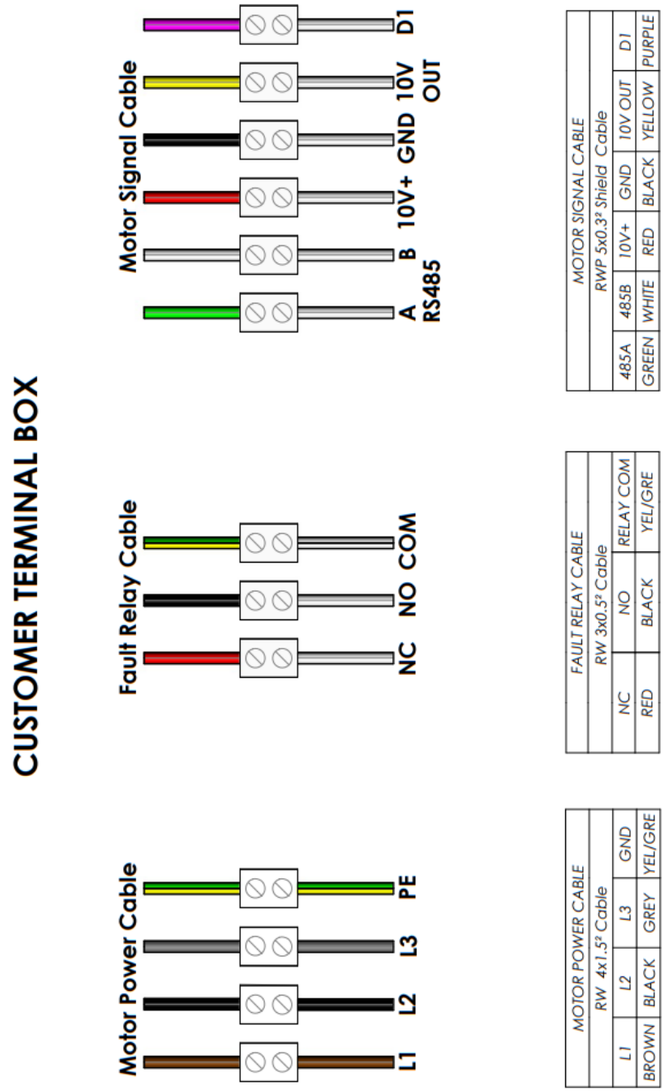
ANALOG INPUT (+10V/A1)	A port used as an analog signal input to adjust the motor speed.
Input voltage	0 – 10V via Analogue Input (1.6V Starting Voltage)
Maximum input voltage	15V
Input impedance	103 kOhm (voltage)
DIGITAL INPUTS (FOR FUTURE USE)	
Input voltage	High: >10-24V_{DC} Low: < 1V_{DC}
Max Input voltage	+24VDC
Input impedance	15M Ohm
RELAY	A fault output interface which consists of a normally open (NO) or close contact (NO)
Contacts	5A 250 VAC or 5A 30 VDC for general Purpose or Resistive use only
AUXILIARY SUPPLY	A Port Used with the Analogue Input (and GND) and a 10kΩ potentiometer, it can form a simple speed regulation circuit (see Figure below).
+10V Out	+10 VDC @10 mA Short-circuit
	
MODBUS RS-485	Port currently only suppors Modbus-RTU and only 32 motors can be connected to the same RS485 bus.

FIGURE 1 - WIRING DIAGRAM: THREE PHASE LOOSE LEAD EC FANS



5.3 SWITCH ON

DANGER! Contact with live electrical terminals must be prevented when the power is switched on.

Although the connections for the control signals and the switches are isolated from the mains supply voltage, do not touch the control or power terminals when the unit is switched on.

Before switching on,

- confirm that the electrical supply is fully compliant with the requirement of the motor as detailed on the motor or fan nameplate,
- confirm that the fan is correctly installed,
- check all component parts and fixings are secure,
- confirm that safety guards are in place,
- check that no loose items or associated equipment are present in the vicinity,

Once the fan is securely fastened, energise the electrical supply. This provides power to the control circuits as well as the motor.

The speed of the fan is infinitely variable in its speed range from 200rpm to its preprogrammed maximum speed. The speed can be set as a 0-10V signal on VSP (voltage set point) input/analogue voltage input or via the Modbus RS485 communications (see Section 10).

Immediately after switch-on check that the direction of impeller rotation and air movement is correct,

- if the rotation direction is incorrect, then this can be rectified by modifying the motor configuration via a software tool. If this is the case, please contact Woods Air Movement head office for further advice,
- check the assembly for smooth, low vibration running,
- check that the current consumption is within the full load current specified on the nameplate,
- the fan motor must not be repeatedly or rapidly switched on and off as this could cause overheating of the motor or its associated wiring connections.

5.4 OPERATION

Fans must not be operated above their maximum indicated speed or run where the fan is operating in a stalled or unstable condition.

Fans must not be run in reverse unless specific advice is sought from Woods Air Movement.

6. MAINTENANCE

DANGER! Before any work can be attempted, the fan assembly, and all controls must be completely isolated from electrical supplies. Ensure that rotating parts are fully at rest.

The fan assembly contains rotating parts and electrical connections which can be a danger and cause injury. Ensure that rotating parts are fully at rest. If there is any doubt that a safe and reliable fan installation can be achieved Woods Air Movement or their representative must be contacted for advice

The motor can cause serious electric shock even after the mains supply is switched off. Always wait for at least three minutes after switching off the device before installation, maintenance or repair.

In case of malfunction a qualified technician should check the DC-link for charge or wait for at least an hour before dismantling the motor for repair.

The motor must always be earthed via the mains safety earth connection. The protective earthing conductor shall comply with the local safety regulations for high protective earthing conductor current equipment.

WARNING! Before entering the area where the fan is installed, please ensure that all fumes, dust, toxic emissions, heat etc. have dispersed from the local environment, and that the fan blades are not likely to rotate.

The housing of the unit is also used as a heat sink and hence can become hot. Take appropriate precautions before touching.

This product causes a DC current in the protective conductor. Where a residual current device (RCD) is used for protection in case of direct or indirect contact, only a Type B RCD is allowed on the supply side of this product. Use RCD of 300 mA minimum.

Always wear appropriate protective clothing (including hard hats, eye protectors and ear defenders etc.) when working in the vicinity of the fan assembly.

CAUTION! In order to comply with the EMC Directive, it is absolutely necessary to follow the installation instructions.

Do not carry out voltage tests (Megger) on the unit as doing so will permanently damage the internal electronic components.

Fan assembly maintenance must be carried out by appropriately qualified and competent personnel using the correct tools and equipment. A regular maintenance schedule should be established, and a record kept. It is recommended that the maintenance activities given in Table 1 (page 18) are followed. Maintenance records are required to be documented throughout the warranty period.

Where the environment is particularly dirty, it may be necessary to reduce maintenance / service intervals. Internal and external fan surfaces may be cleaned with low pressure clean water and non-abrasive additives. Water or liquid cleaning agents must not be directed at motor drain holes, as this could cause liquid ingress.

After maintenance has been conducted and before the fan is re-started, always ensure that there are no loose items of equipment present in the vicinity of the fan, that all safety guards, chains, or steel ropes, etc., are properly secured into their original location, and that any temporary device used to stop the fan impeller from rotating has been removed.

6.1 FIXINGS

It is essential to ensure that all fan assembly fixings are secure. When examining and checking the security of fixings during routine maintenance (see Table 1 Items 11 and 12), any fixings which have locking devices fitted or are painted over, need not be disturbed if it can be seen that they are secure. Any locking devices that are disturbed during maintenance must be discarded and replaced with new identical devices. Thread forming screws must have locking compound applied when being reused. Any fixings which have no locking devices fitted and are not painted over, must be checked at 95% of their original torque setting to ensure that no unnecessary disturbance of the fixing has occurred. See Figure 2b (Page 21) for torque setting details. If in doubt, please contact Woods Air Movement for advice in relation to specific fixing torque values.

6.2 Infrequent Use

If the fan assembly is to be used less frequently than once a month the fan should be operated between 15 and 30 minutes each month to ensure that correct lubricant conditions are maintained within the bearings.

7. OVERHAUL / EXTENDED MAINTENANCE

Advice on motor overhaul procedures, bearing /seal replacement, motor replacement, motor rewinding, spare parts, condition monitoring, vibration analysis, refurbishment, etc. is available from Woods Air Movement service centre in Colchester.

NOTE! After overhaul/extended maintenance the fan assembly must be correctly installed back into its original position.

8. FAULT FINDING

Please refer to the safety warnings (“attention” items) stated within Section 1 and 6.

NOTE! Routine maintenance procedures detailed in Section 6, and Table 1 of this document are designed to help keep your fan operational and fault free.

8.1 ELECTRICAL

Check that electrical connections to the fan are secure and are in accordance with the wiring connection diagram.

Check that the voltage applied at the PDS as specified on the fan nameplate and is balanced. Measure the current on each phase of the motor in turn and check that the current consumption is within the full load current specified on the motor or fan nameplate.

The PDS has protection features implemented which will cause the motor to switch off (trip) to prevent damage to the unit. Contact Woods Air Movement Colchester for advice.

8.2 MECHANICAL

Check that there are no obstructions to the motor shaft or impeller blades, that the blades are clean, and that there are no loose components, items, or debris in the vicinity.

Rotate the motor shaft by hand. Investigate any grinding noises, internal chafing, rubbing or stiffness. If any of these defects are observed, this may indicate that bearings require lubrication or replacement.

Ensure that all fixings are secure and tightened to the correct torque values.

9. DISPOSAL

NOTE!

Metal components of the fan/motor should be segregated and separately recycled. Generally, all metals, such as steel, aluminum, copper, precious metals, rare earth magnets, and plastics can be dismantled and recycled. Printed circuit boards, including electrolytic DC-link capacitors, need selective treatment according to IEC/TR 62635 guidelines. The following items of material should be safely disposed of in accordance with local health and safety regulations:

- Printed circuit boards & components,
- electrical lead coverings,
- motor winding insulation materials,
- bearing lubricant,
- motor/fan terminal block,
- paintwork,
- plastic parts,
- packing materials,

WARNING! A face mask and gloves must be worn when handling the infill. If the infill is particularly dry or is damaged it should be damped down before disposal.

10. MODBUS COMMUNICATIONS USING PC TOOL

Please refer to Woods Air Movement on PC Tool service support using RS485 port.

The following Modbus Parameters can be read and/or written to with PC Tool for fault diagnosis/rectification by Woods Air Movement Service Engineers.

ID	READ/WRITE	Name	Notes
10001	R	Motor software	Software Version
10003	R	Motor hardware	Hardware Version
10004	R	Power_on time	Long CD AB, min
10006	R	Device Type	Supporting fan model
10024	R/W	Command from	Divided into two: 0: RS485; 1:VSP RS485: Modbus communication by PC Tool VSP: 0-10V External Voltage Input
10027	R/W	Modbus address	Range: 1-127
10049	R/W	Start enable	1: Enable; 0: Disable
10050	R/W	Speed setpoint	The motor runs according to this value
10051	R	Motor speed	Motor running speed
10052	R	DC Voltage	Motor running bus voltage: VDC
10053	R	Output AC Voltage	ADC
10054	R	Motor Current	Motor running current: 0.01A
10055	R	Motor power	Motor running power: W
10056	R	Ntc temperature	NTC temperature: °C
10057	R	VSP input speed	When in VSP control mode, check the corresponding speed of the VSP input
10058	R/W	Rotation direction	The direction you want the motor to run 1: CW; 2:CCW
10059	R	Err Flag	Motor running error state 5: Input phase loss; 7: Over voltage; 9: Under voltage; 11: Overload; 13: Output phase loss; 14: IGBT overtemperature; 31: Over current; 44: Rotor blocked
10060	R	Running State	0: The motor stops without any errors; 1: The motor is running ; 2: There is a fault with the motor stopping

11. DECLARATIONS OF CONFORMITY

EC Declaration of Conformity

Herewith we declare that the air movement equipment designated below, on the basis of its design and construction, in the form brought on to the market by us, is in accordance with the relevant health and safety requirements of the **EC Council directives on Machinery and Electromagnetic Compatibility and also ecodesign requirements for energy-related products.** If alterations are made to the machinery without prior consultations with us, this declaration becomes invalid. We further declare that the equipment identified below may be intended to be assembled with other equipment/machines to constitute machinery, which shall not be put into service until the assembled machinery has been declared in conformity with the provisions of these EC Council directives.

Designation of equipment:	
Series / type:	
Fläkt Woods Limited order no:	**/ 0**
Relevant EC Council directives:	Machinery Directive (2006/42/EC). Electromagnetic Compatibility Directive (2014/30/EU) where applicable (1) Energy-related products Directive (2009/125/EC) relevant implementing measures: REGULATION (EU) No 327/2011, REGULATION (EU) No 1253/2014, where appropriate
Applied harmonized standards in particular (2):	EN ISO 12100:2010, EN 60204-1:2018, EN ISO 12499:2008, EN ISO 5136:2010 EN ISO 5801:2017, EN ISO 13350:2015, EN IEC 61000-6-2:2019, EN 61000-6-1:2007 EN 61000-6-3:2007/A1:2011/AC:2012, EN 61000-6-4:2007/A1:2011
Applied national standards and technical specifications in particular (3):	BS 848.2-1:2004 (BS ISO 13347-1:2004/A1:2010) BS 848.6:2003 (BS ISO 14695:2003) BS 848.7:2003 (ISO 14694:2003/A1:2011)
Basis of self attestation:	Quality Assurance to BS EN ISO 9001:2015 BSI Reg Firm Cert No. FM 155.
Technical file compiled by:	Ömer Tüzer FläktGroup Holding GmbH, Bahnhofstr. 65-71, 44623 Herne, Germany
Signed for and on behalf of the manufacturer by:	Place: Colchester Date: 03/10/2023
Position of signatory:	Stéphane Maravel Chief Officer Woods

Notes:

(1) Fläkt Woods fans are driven by AC induction motors which are inherently compliant if supplied with a truly sinusoidal AC supply. Where the fan motor is supplied via an inverter or other electronic control, verification of its compatibility together with cabling should be sought from the control supplier.

(2) For a complete list of applied standards and technical specifications see Fläkt Woods documentation.

(3) Where no relevant harmonised standards exist.

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Website: www.woodsairmovement.com

Registered in England no. 233771
Registered office: Axial Way, Colchester, CO4 5ZD, United Kingdom

UKCA Declaration of Conformity

Herewith we declare that the air movement equipment designated below, on the basis of its design and construction, in the form brought on to the market by us, is in accordance with the relevant health and safety requirements of the **UK Parliament Regulations on Product Safety, Electromagnetic Compatibility and Ecodesign for Energy-Related Products.** If alterations are made to the machinery without prior consultations with us, this declaration becomes invalid. We further declare that the equipment identified below may be intended to be assembled with other equipment/machines to constitute machinery, which shall not be put into service until the assembled machinery has been declared in conformity with the provisions of these UK Parliament Regulations.

Designation of equipment:	
Series / type:	**PowerBox³**
Fläkt Woods Limited order no:	
Relevant UK Regulations:	Supply of Machinery (Safety) Regulations 2008 Electromagnetic Compatibility Regulations 2016 where applicable (1) Ecodesign of energy-consuming products relevant implementing measures: REGULATION (EU) No 327/2011, REGULATION (EU) No 1253/2014, where appropriate
Designated standards in particular (2):	EN ISO 12100:2010, EN 60204-1:2018, EN ISO 12499:2008, EN ISO 5136:2010 EN ISO 5801:2017, EN ISO 13350:2015, EN IEC 61000-6-2:2019, EN 61000-6-1:2007 EN 61000-6-3:2007/A1:2011/AC:2012, EN 61000-6-4:2007/A1:2011 BS ISO 13347-1:2004/A1:2010, BS ISO 14694:2003/A1:2011, BS ISO 14695:2003
Basis of self attestation:	Quality Assurance to BS EN ISO 9001:2015 BSI Reg Firm Cert No. FM 155.
Technical file compiled by:	Iain Kinghorn Fläkt Woods Limited, Axial Way, Colchester, CO4 5ZD, United Kingdom
Signed for and on behalf of the manufacturer by:	Place: Colchester Date: 06/10/2023
Position of signatory:	Stéphane Maravel Chief Officer Woods

Notes:

(1) Fläkt Woods fans are driven by AC induction motors which are inherently compliant if supplied with a truly sinusoidal AC supply. Where the fan motor is supplied via an inverter or other electronic control, verification of its compatibility together with cabling should be sought from the control supplier.

(2) For a complete list of applied standards and technical specifications see Fläkt Woods documentation.

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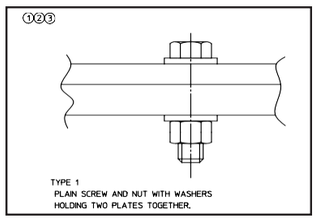
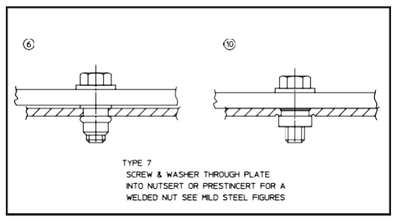
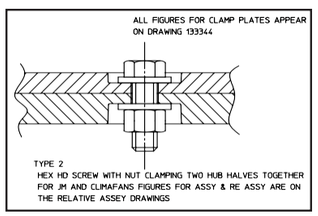
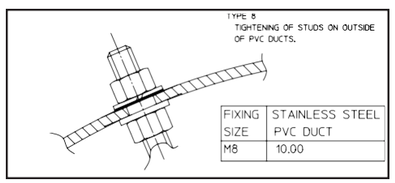
Routine Maintenance Schedule	Every 6 Months	Every 12 Months	Comments
1. Examine fan guards (if fitted)	✓		Remove any debris that may have accumulated round or on the guard surface.
2. Examine motor cooling fins	✓		Remove any material or dirt which has build-up between the motor cooling fins.
3. Examine impeller for dirt build-up or any physical damage	✓		Remove any build-up of dirt. Ensure impeller is secure. Replace impeller if it is damaged.
4. Check condition and tautness of fan safety support chains/harnesses/ropes (if fitted)	✓		Clean and inspect safety supports. Replace if there is any deterioration / corrosion detected.
5. Examine condition of safety guards (if fitted) and associated fixings	✓		Clean safety guards. Replace if there are any signs of excessive corrosion or damage
6. Check operation of anti-condensation heaters (if fitted)	✓		Switch off power to the motor. Check that the anti-condensation heater is energised (i.e. it is drawing current).
7. Examine the clearance between the fan impeller blade tips and fan duct. Check the angle, and the security of the impeller blades		✓	Ensure that the gap between the impeller blade ends and the fan duct is even and adequate. If in doubt, please contact Woods Air Movement for advice related to blade tip gap. Ensure that the impeller blades are secure. Blade angle must not be changed before contacting Woods Air Movement for advice.
8. Check torque of fixings used to secure the fan to its support structure.		✓	It is essential to confirm that all fixings are properly fitted, are tight, and are fully driven home (see Figure 2a and 2b). If in doubt, please contact Woods Air Movement for advice related to the torque value of a particular fixing.
9. Examine motor, fan and ancillary equipment fixings		✓	It is essential to confirm that all fixings are properly fitted, are tight, and are fully driven home (see Figure 2a and 2b) If in doubt about the torque of a fixing contact Woods Air Movement for advice.
11. Check movement (deflection) of vibration isolators (if fitted)		✓	Check freedom of movement. Tighten anti-vibration mount fixings if necessary.
12. Check motor voltage and current consumption		✓	Ensure voltage and full load current are as specified on the motor nameplate
13. Inspect paintwork / galvanising finish		✓	Treat any areas of damage with suitable anti-corrosion paint.
14. Check fan assembly wiring		✓	Check security and condition of all wiring (including the earth).

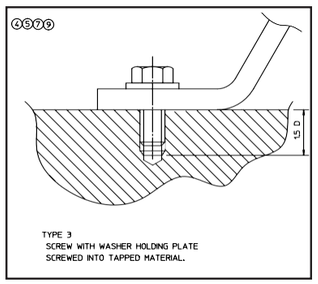
FIGURE 2a

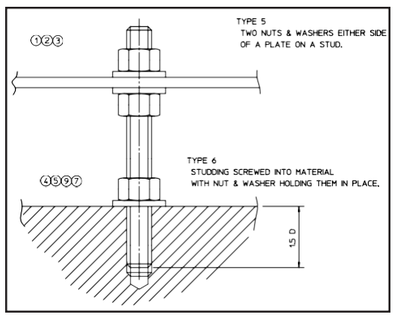


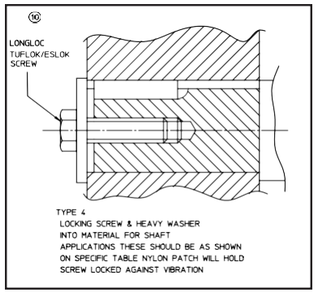












NOTE!
The numbers show thus ⑧ in the boxes

are to show the screw types and tapped materials which are appliciable to the diagram shown.

NOTE!

1) These figures shown apply unless shown otherwise on specific assembly drawings.
2) All joints are to be dry except Stainless Steel which is to have MOLYCOTE 1000 Paste Compound, prior treatment of Loctite Activator T will decrease curing time if necessary.
3) All values are in Nm. The conversion factor is given for lbf-ft equipment.
   lbf-ft = Nm x 0.7375
4) There is a tolerance on Torque Wrenches up to ± 5%.
5) Nuts are to be tightened only once so no overtightening can occur.
6) The head of the Screw makes no difference to torque figures other than how the torque is supplied. The Screw or Base Material are the important factors for torque.
7) When using two materials always use the lowest figure of the two.
8) The figure to be used on AEG Capacitor Studs is 4 Nm.
9) The material being clamped is only to be taken into consideration if it is Hollow, very Ductile or Plastic. Please seek advice where necessary.

FIGURE 2b

TABLE OF TORQUE SETTINGS FOR FIXINGS (DRAWING NO: D248284)

FIXING SIZE	① STEEL 8.8	② STAINLESS STEEL A2,A4 PROP 70	③ M.S. FIXINGS NOT 8.8 GRADE INCLUDES T BOLTS	④ STEEL INTO TAPPED M.S.	⑤ STEEL INTO EXTRUDED AL	⑥ NUTSERT	⑦ SCREW INTO CAST ALUM ALSO SEE MOTOR TABLE BELOW	⑧ TAPTITE SELF FORMING	⑨ INTO CAST IRON ALSO SEE MOTOR TABLE BELOW	② STAINLESS STEEL A2,A4 PROP 80	⑩ PRESTICERT
M1.6	0.2000	-----	0.1000	0.1000	-----	-----	-----	-----	0.050	-----	-----
M2	0.4000	-----	0.2000	0.2000	-----	-----	-----	0.400	0.100	-----	5
M3	1.5000	0.9000	0.8000	0.8000	-----	1.50	-----	1.400	0.400	1.2	6
M4	3.5000	2.0000	2.0000	2.0000	-----	3.50	-----	3.000	1.000	2.7	9
M5	7.0000	3.9	3.5000	3.5000	-----	7.00	-----	6.000	1.750	5.3	11.5
M6	12.000	6.9	6.0000	6.0000	5.00	12.00	7.00	10.000	3.000	9.2	12
M8	28.000	17.0	15.000	15.000	10.00	28.00	14.00	25.000	7.500	22.0	21
M10	55.000	33.0	30.000	30.000	20.00	40.00	28.00	55.000	15.000	43.0	23
M12	100.00	56.0	50.000	50.000	36.00	55.00	50.00	95.000	25.000	75.0	35
M14	155.00	89.0	80.000	80.000	60.00	-----	85.00	-----	40.000	119.0	-----
M16	245.00	136.0	120.00	120.00	95.00	-----	135.00	-----	60.000	181.0	-----
M18	335.00	191.00	170.00	170.00	-----	-----	-----	-----	85.000	254.0	-----
M20	475.00	267.00	240.00	240.00	178.00	-----	200.00	-----	120.000	356.0	-----
M22	645.00	364.00	325.00	325.00	245.00	-----	300.00	-----	-----	485.0	-----
M24	820.00	460.00	410.00	410.00	310.0	-----	420.00	-----	450.000	613.0	-----
M27	1200.0	671.00	600.00	600.00	-----	-----	-----	-----	-----	895.0	-----
M30	1640.0	915.00	820.00	820.00	-----	-----	-----	-----	-----	1220.0	-----
M33	2225.0	-----	1115.0	1115.0	-----	-----	-----	-----	-----	-----	-----
M36	2855.0	1600.00	1425.0	1425.0	-----	-----	-----	-----	-----	2121.0	-----
M39	3700.0	-----	1850.0	1850.0	-----	-----	-----	-----	-----	-----	-----
M42	4565.0	-----	2285.0	2285.0	-----	-----	-----	-----		-----	-----
M45	5690.0	-----	2840.0	2840.0	-----	-----	-----	-----	-----	-----	-----

⑧ **NOTE** that Taptite screws may need a high torque to start the thread forming process

BINX NUTS

Binx Nuts Grade 6 are unmarked and should be tightened to torque value specified for Mild Steel fixings (all sizes).
Binx Nuts Grade 8 should be tightened to torque value specified for Grade 8.8 fixings.

RUBBER A/V

Where a rubber grommet or flexible mount is used a metal spacer tube or metal insert should be supplied. The rubber should never be crushed by the fixings for any special application seek advice from technical support.

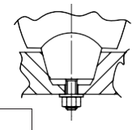
NOTE!

Brass fixings have half the shear strength of cast iron so use half the figures for tapped cast iron.

TYPE 9

Special arrangement of locking impeller blade into hub. For this application see specific assembly DRG only for correct torque figures.

The torque wrenches should be set to ±5% tolerance.



PAD AND FOOT MOUNT TORQUE SETTINGS					
ON HOLLOW FOOT USE LOAD SPREADING WASHERS AND SAME TORQUE AS SOLID FOOT					
		MOTOR PAD TO ARM		FOOT MOUNT	
FRAME SIZE	THREAD/HOLE	ALUMINIUM	CAST IRON	ALL	WASHER
		TORQUE SETTING IN Nm			
D63/71	M8 TAPSITE	20-25	20-25	20-25	
M8 TAPSITE REASSEMBLY		15	15		
D63/71	M8	15	15		
	M10	35	35	50	
D80	M12	55	55	85	83770
D90	M12	55	55	85	1504
D100	M12	55	55	85	411590
D112	M12	55	55	85	411590
D132	M16	135	135	180	251691
D160/180	M20	240	240	350	251692
D200 - 315	M24		450	450	267652
LARGER	M24		450	450	

NOTE

All foot mounted motor fixings should be applied with Loctite compound. For any fixings exceeding M24 please contact Woods Air Movement for details.

TABLE 10 SHAFT END FIXINGS		
MOTOR SIZE	THREAD SIZE	TORQUE VALUE
BT4, 5 & 9		
CT5, CT9 & D80	M6	006.000
D90S & D90L	M8	015.000
F22, D100L & D112M	M10	030.000
D132S, D132M	M12	050.000
D160M, D160L		
D180M, D180L	M16	120.000
D200L, D225S		
D255M, D250S,		
D250M, D280S	M20	180.000
D280M, D315S		
D315M		
D315 ABB	M24	295.000
LARGER	M24	295.000

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