



INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

Off-Loading

During off-loading inspect fans for damage. If the casings, cowls or impellers are damaged, notify your local Draught Force distributor immediately. Draught Force cannot be held responsible for any loss or damage incurred to goods during transport, off-loading or on site.

Site Storage

The fan must be stored in clean, dry conditions free from vibration. If the fan is stored for more than a month, the impeller should be rotated by hand at least once a month to prevent bearing damage.

Operating Conditions

Standard fans are supplied suitable for use in ambient temperatures of -30°C to $+40^{\circ}\text{C}$. If fans operate below 0°C steps must be taken to prevent icing of the fan blades.

Installation - Duct Mounted units

If design fan performance is to be achieved the fan must be installed with good inlet and discharge duct connections. Ideally straight duct no smaller than the fan diameter should extend at least 3 diameters on both inlet and outlet. Flexible connections should be taut and ducts aligned correctly with fan casings. Sharp bends adjacent to the fan should be avoided at all costs. Where changes in duct size/shape are necessary, transformations should be smooth with a maximum included angle of 60° at the fan inlet and 30° at the fan outlet. If there is no duct connected at the fan inlet, an inlet cone should be fitted. Airflow direction arrows are provided on the fan casing to allow correct orientation. The fan supports should be adjusted so that the fan casing is not distorted.

If units are belt driven, pulleys must be correctly aligned, and belts must be correctly aligned and tensioned. Tension must be checked 2-4 weeks after start-up.

Installation - Roof Mounted units

The fan housing should be lowered onto a prepared support upstand which provides even support all around the fan base. Fix a sealing strip of neoprene to the top of the upstand to prevent air leakage. Units may be installed on roofs with pitch not exceeding 15° . Care must be taken to ensure that the axis of non-return weather shutters is always located along the fall of the roof so that shutters do not jam open.

Safety - Rotating fan impellers can be a danger to personnel.

The following precautions must be taken:-

Electrically isolate the fan motor prior to undertaking any work.

Ensure that all fasteners, particularly impeller fasteners, are tight prior to start-up. Do not re-use locking fasteners.

Regularly check impeller fasteners for tightness.

Where fans are accessible to personnel or directly exposed to habitable areas, protective guards must be used.

Prior to fan start-up, ensure loose debris will not be sucked into the fan.

All ductwork should be clean.

Electrical Connection

Prior to installation the motor winding resistance to earth should be checked. If it is found to be less than 1 megohm the electric supply should not be connected.

Before connecting the electric supply, check to ensure that the voltage, frequency and number of phases comply with the details given on the fan nameplate. Where multi-speed motors are fitted, particular attention must be given to the specific connection diagrams supplied in the connection box. If doubt exists, please contact DRAUGHT FORCE or their agents for clarification.

Electrical Connection (continued)

The direction of rotation is marked on the fan casing. Single-phase motors are correctly connected prior to dispatch. Three phase motors may require reversal after a trial connection; this is achieved by interchanging any two phases of the incoming supply.

Earthing

All fans must be earthed in accordance with AS3000 or to local Standards.

Special Purpose Motors - Duct Mounted Units

Where motors are supplied for high temperature or hazardous area operation, external fan terminal boxes may not be provided. In these cases incoming electrical cables should be connected directly to the motor terminal box within the fan case by means of the access panel provided.

Protection

Any fuse or circuit breaker in the circuit should only be regarded as protection for the wiring against short circuits or faults - it will not offer proper protection to the electric motor. Fuses must be able to carry starting loads and these can be taken as a minimum of six times the running current for 25 seconds. A separate overload protection device must be fitted which should be set at 15% above the measured current or 10% above full load current, whichever is the lower. Motors fitted with thermistor or thermostatic protection should have these wired into the starting contactors' control circuit to interrupt motor power supply on winding temperature rise. Wires marked 'TK' are for internal thermal contacts which should also be wired as above.

Anti-condensation Heaters, where fitted, should be connected such that when power to main motor windings is shut off the heaters are energised (please check motor nameplate to verify actual connection voltage) to prevent cooling of the motor windings. This will prevent condensation forming on the windings which can lead to insulation breakdown. Naturally the heaters should be switched off prior to motor start-up.

Starting

All fans are suitable for direct-on-line starting by switch or automatically by contactor up to and including 5.5kW. The number of starts should be limited to no more than four per hour or, in the case of motors of less than 1 kW, no more than eight starts per hour. This would be subject to local supply regulations which may also apply to the starting of larger motors.

Pre-start Check List

- Check power supply for correct voltage and phase availability.
- Check fan is free to rotate.
- Fit overloads.
- Ensure ductwork is free of debris.
- Check rotation of fan.
- Check the motor amperage draw does not exceed nameplate rating.

Maintenance

After three months and thereafter at regular intervals an inspection should be carried out to ensure that dirt has not built up around the fan blade (which can affect performance) or on the motor (which can cause overheating) and to check for tightness of fastenings. Belt driven fans should have the belt tension checked after 2-4 weeks and thereafter at three monthly intervals.

Most motors are fitted with sealed-for-life bearings which are virtually maintenance-free.

Lubrication

Where grease nipples are provided, relubrication should be carried out in accordance with details shown on the motor nameplate (if provided) or else in accordance with the schedule below. Wherever possible the grease used should be identical to that originally used. When different greases are mixed, even if they are both suitable for the conditions, incompatibility can occur and result in rapid bearing failure.

Relubrication - Fan Motors

Motor Size	Relubrication period - Working Hours		
	3000 rpm	1500 rpm	1000 rpm or slower
D132	5000	10000	20000
D160	5000	10000	18000
D180-200	3500	9000	14000
D225-250	2500	8000	12500
D280	2000	7000	11500

Relubrication - Belt Drive Fan Bearings

Fan Size	Relubrication period - Working Hours	
	Up to 3000 rpm	Up to 1500 rpm
Up to 500 mm	5000	12000
560 - 710 mm	5000	10000
800 mm	5000	8000
& above		

In the absence of specific instructions supplied with the fan the following greases should be used:

- STANDARD FANS - Shell Alvania R3 or compatible lithium-based grease suitable for 130°C continuous operation.
- SMOKE SPILL and CLASS 'H' motors. Dow Corning Molykote 44, Magnalube-G or compatible silicon-based grease suitable for 200°C continuous operation.

If the grease lines are not extended to the outside of the case the fan must be electrically isolated for safety. Clean the grease nipples with a clean cloth. Introduce the new grease to all points while the fan is rotating until the old grease is purged from the grease relief port normally located at the bottom of the bearing housing. If it is required to manually rotate the impeller, the fan must be electrically isolated to prevent accidental startup.

If the grease lines are extended to the outside of the case and regular re-greasing has not taken place, first disconnect the lines from the bearings and flush through to remove old hardened grease prior to introducing new grease as above.

INCOMPATIBLE GREASE, EXCESSIVE GREASE OR INCORRECT GREASE RELIEF CAN CAUSE DAMAGE TO THE MOTOR.

Standard motors are not suitable for handling saturated air containing water droplets. If excessive moisture is present in airflows, then the fan should not be switched off until 10 minutes after the source of moisture (e.g. from process or canopy) has ceased. This will allow the duct/fan system to be purged of excessive moisture which could contribute to premature motor insulation breakdown. If motor is fitted with anti-condensation heaters which are to be used (refer to **Protection** above) then this precaution may be omitted.

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