



Donaldson
FILTRATION SOLUTIONS

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

PowerCore® Mist Collectors
Series CPC

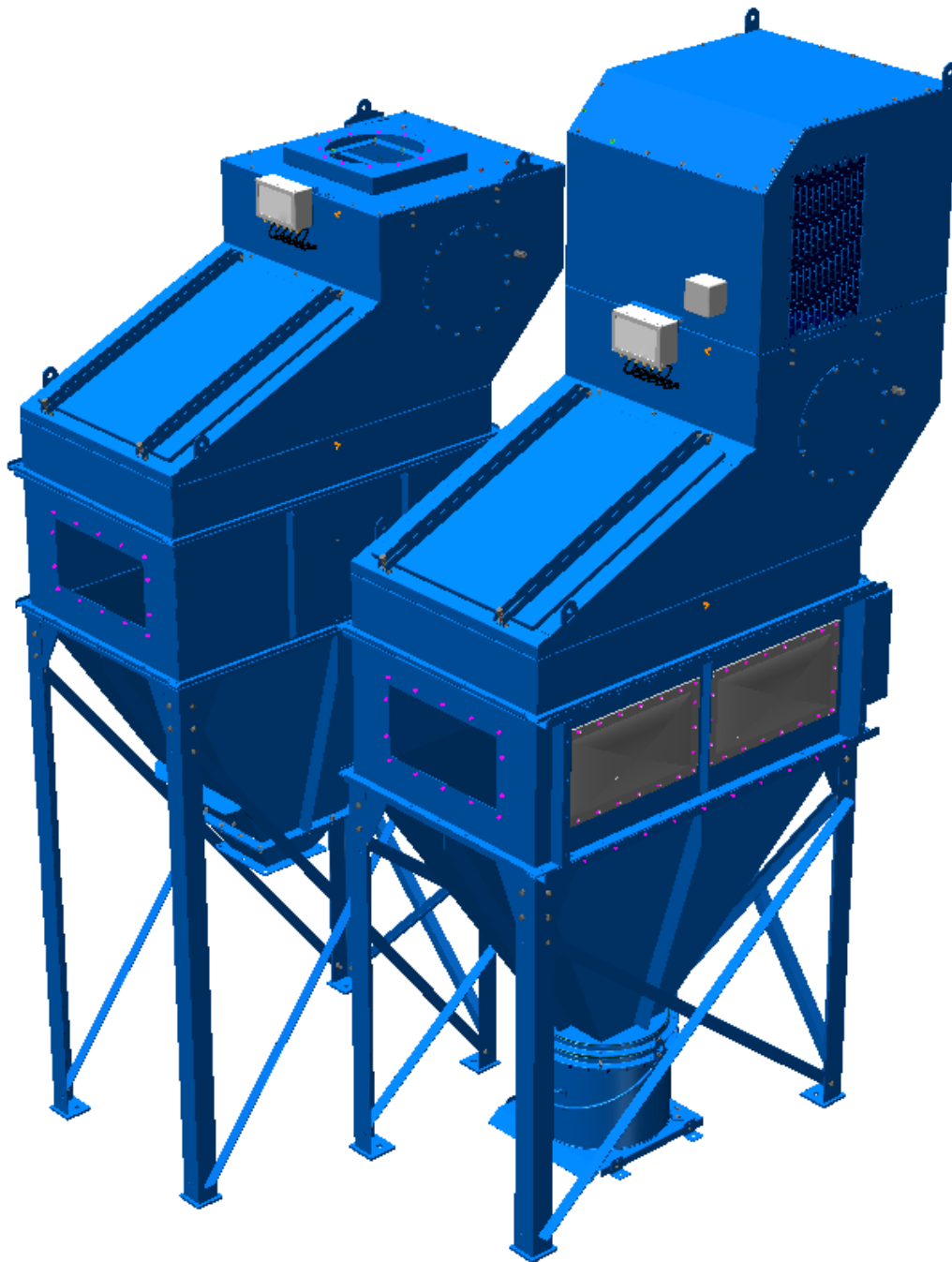


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SAFETY RECOMMENDATIONS

This manual contains specific precautionary statements relative to worker safety in appropriate sections. To avoid dangerous situations we give you the following advice:



Refers to special information on how to use the mist collector most efficiently.



Refers to special information directed towards preventing damage.



Refers to special information designed to prevent injury or death.



The collector should be stored as supplied. Only remove packaging to install. For the purposes of storage:

- *Collector with specification for inside use = IP50.*
- *Collector with specification for outside use = IP54.*



The dust collector should be used only when it is in a technically acceptable condition. Regular maintenance, as set out in this manual, is required to minimise technical failure. Third party supplied components (for example motors) should be maintained according to the manufacturer's instructions.



You should ensure any persons carrying out work on the supplied equipment follow any relevant recognised standards/codes, have received adequate training and are competent to do so. Areas requiring a competent person include:

- *Maintenance on any component identified as a potential ignition source.*
- *Lifting and erection.*
- *Electrical installation, inspection and maintenance work.*
- *Pneumatic installation, inspection and maintenance work.*
- *Any access to internal classified potentially explosive atmospheres where there may be a risk due to explosion.*

During assembly/installation or dismantling of equipment, potential ignition sources may occur that were not considered in the risk assessment of the unit in operation (for example, grinding, welding sparks, etc.)



You should use the dust collector in full accordance with the conditions set out in the Order Acknowledgment and relevant Scope of Delivery. Failure to do so may compromise product reliability, warranty and safety. The Scope of Delivery is an integral part of the manual.



Other items of equipment, not supplied under the Scope of Delivery from Donaldson, should be installed, operated and maintained according to the documentation supplied with the respective equipment.



Any modification carried out on the 'as supplied' equipment may reduce reliability and safety, and will nullify warranty; such actions fall outside the responsibility of the original supplier.



The hopper should not be used as a storage vessel. To prevent damage to the collector, care should be taken to avoid an excessive build up of heavy materials.



Where necessary for safety, the dust collector is fitted with fixed guards. Removal of these guards and any subsequent work should only be carried out after adequate precaution is taken to ensure it is safe to do so. All guards should be refitted before re-energising.



The access door requires tools to open. To avoid danger from rotating fan impellor, ensure fan is isolated and allow sufficient time for fan to become stationary.



Compressed air is recommended for collectors that operate using reverse jet cleaning. Alternative gases should be assessed before use to ensure that explosive atmospheres are not introduced during media cleaning.



Where the equipment supplied is suitable for working within a potentially explosive atmosphere (as defined by Directive 2014/34/EU) it will be according to the categories and conditions marked on the collector serial nameplate. You should ensure the equipment supplied by others is also suitable. If no marking is given on the serial nameplate then the supplied equipment is not suitable for use in potentially explosive atmospheres.



Care should be taken to ensure that any potentially explosive atmosphere is not present when performing operations that increase the risk of ignition (opening of controller for adjustment or electrical repair for example). Ensure the installation is always returned to its original state.



To reduce the risk of ignition when handling explosive or flammable materials, it is important that the accumulation of flammable deposits are prevented/removed, e.g. from within ducting etc.



If the collector is handling a potentially explosive dust or is placed in a potentially explosive atmosphere, then all motors should be connected to thermal protection devices to prevent them exceeding their maximum surface temperature. All electrical equipment should comply with a category according to EN 60079-0.



Where the dust being processed can ignite due to exothermic reaction, including self ignition, the installation **MUST** be fitted with a suitable explosion protection method (venting for example). The risk of ignition can be minimised by avoiding the accumulation of dust layers with regular cleaning.



The dust collector may be fitted with explosion protection in the form of a vent panel. Precautions, as set out in the Scope of Delivery, are used to minimise the risk of ignition of any dust clouds contained within the dust collector. The possibility of other ignition sources being introduced into the collector during periods where any dust cloud may be present should be minimised. Particular care should be taken to avoid introducing glowing particles via the collector inlet ducting.



The explosion relief assembly, where fitted, has been designed to provide adequate safety from an explosion initiated from within the collector, for the given dust explosion characteristics and collector arrangement as set out in the Scope of Delivery. You should ensure that explosions are not allowed to propagate into the dust collector (using suitable isolation devices) since pressures may be generated leading to unsafe equipment rupture.



Where applicable, equipment connected to the dust collector (for example, a cyclone) should be protected, using suitable isolation devices, against the transfer of flame and pressure if, in the event of an explosion initiating inside the dust collector, the connected equipment is not capable of safely withstanding these effects.



The explosion relief assembly, where fitted to the dust collector, is not suitable for use with dusts that are classified as poisonous, corrosive, irritant, carcinogenic, teratogenic or multigenic unless the dust released during the explosion venting process can be contained to a safe level.



In order to ensure the required venting efficiency is maintained, the explosion relief assembly, if fitted to the collector, should not be obstructed in any way.



It may be necessary to provide a facility to shut down the equipment in the event of an explosion (where collectors are fitted with explosion relief panels). The signal should be taken from the bursting panel detection device.



Part of the risk assessment on possible ignition sources for dust and gas mixtures with very low MIE, has considered the electrostatic risk from cone discharges. Here the basis of safety is based on using a conductive bin, dusts with a median particle size of less than 400µm and advising frequent emptying.



You may wish to consider the use of a sprinkler system when handling explosive or flammable materials.



None of the fan assemblies can be considered to be a fully sealed design, indeed most are arranged with either an open inlet or an open outlet. For this reason, the internal and external atmospheres can be considered the same in terms of any potentially hazardous classification.



Standard fan assemblies should not exceed 3000 rpm (50 Hz supply) on systems fitted with an inverter drive.



The filtration media is suitable for filtering particulate only (and not gas).

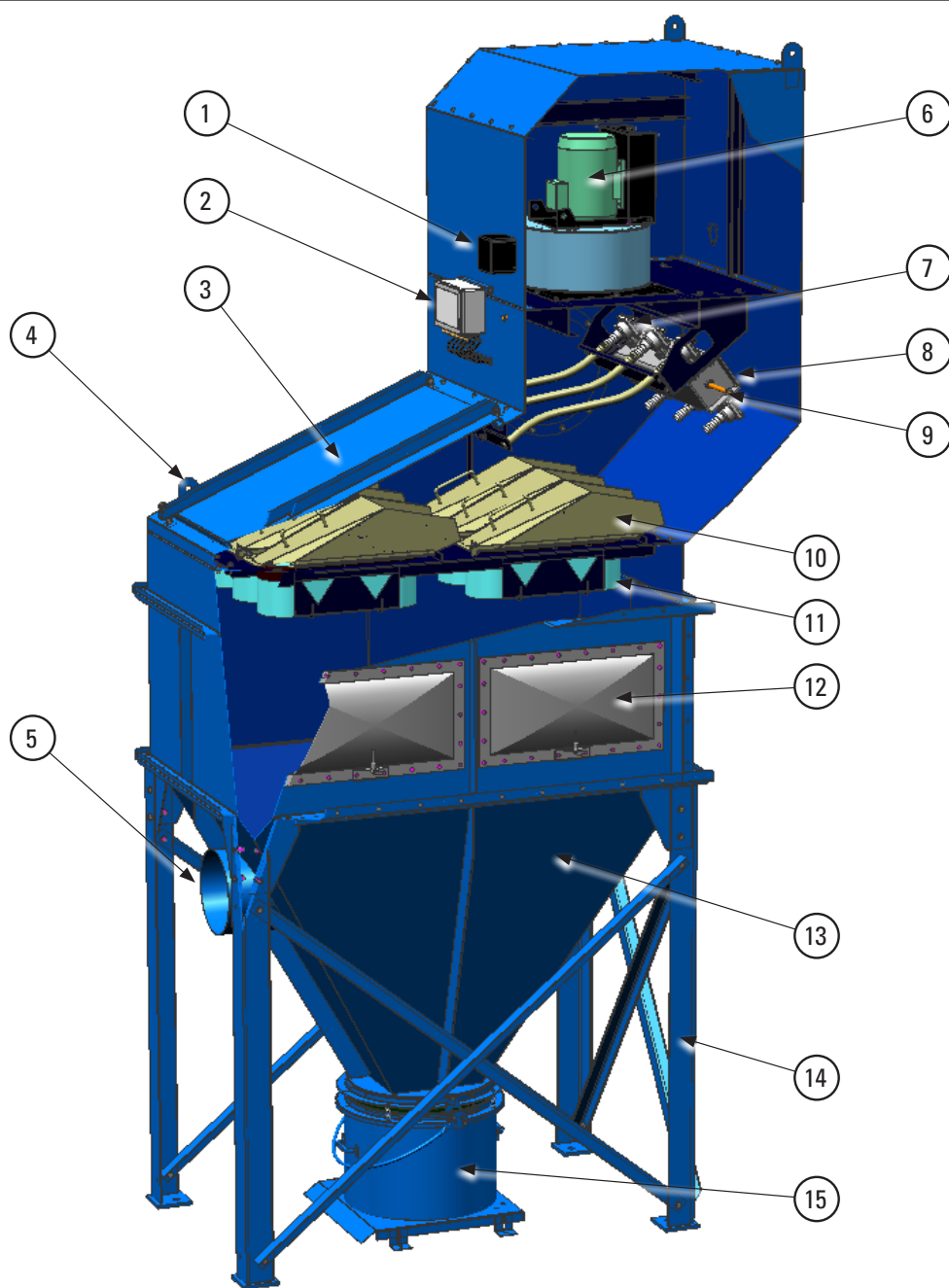


Some applications are prone to risk of fire. This risk can be reduced by pulse cleaning and emptying the dust container regularly.

- Any extinguishing technique and material used must be suitable for the flammable nature of the dust.*
- A water sprinkler system can be fitted as a special option.*

Materials handled by the dust collector may be hazardous (e.g. toxic). Conduct a Risk Assessment to ensure correct technique is employed.

INSTALLATION



- | | | | |
|---|--------------------------------------|----|----------------------|
| 1 | Fan terminal box | 9 | Compressed air inlet |
| 2 | Controller | 10 | Filter pack retainer |
| 3 | Hinged access door | 11 | Filter pack |
| 4 | Lifting bracket | 12 | Explosion relief |
| 5 | Contaminated air inlet | 13 | Discharge hopper |
| 6 | Fan motor | 14 | Support |
| 7 | Diaphragm valve | 15 | Dust container |
| 8 | Compressed air distribution manifold | | |



**The Power Box must be fitted on the opposite side to the explosion panels on CPC-6, CPC-8 and CPC-12 collectors fitted with explosion relief.*

Figure 1: PowerCore dust collector (model CPC-6F illustrated)

Product information



Where equipment is installed in a Potentially Explosive Atmosphere, care should be taken not to locate or use the collector where external ignition sources can be introduced, for example stray electric currents, lightning, electromagnetic waves, ionising radiation, ultrasonic waves.



When handling explosive or flammable materials and the risk of a fire is high, then precautions such as fitting a sprinkler system and not locating the collector in a zone 21/1 area should be considered.



When handling explosive or flammable materials the collector should be located so as to avoid external heat sources, e.g. from nearby processes or extreme direct sunlight.



The collector is not designed to support site-installed ducts, interconnecting piping or electrical services. All ducts, piping or electrical services must be adequately supported.



All external equipment connected to the outlet (e.g. ducting) should be correctly sealed. This can be achieved by applying a continuous 5 mm bead of sealing compound to the mounting surface, along each side of the hole pattern. For non-Donaldson equipment please also check supplier's IOM manual for any specific requirements.

General guidance to lifting

Refer also to figure 2.



The collector should be lifted using the four lifting points provided.



During all lifting operations a crane or fork lift with an adequate SWL (safe working load) must be used. (Refer to lifting label located adjacent to lifting points for weight of equipment supplied by Donaldson).



Slings with an adequate SWL (safe working load) must be used. (Refer to lifting label located adjacent to lifting points for weight of equipment supplied by Donaldson).



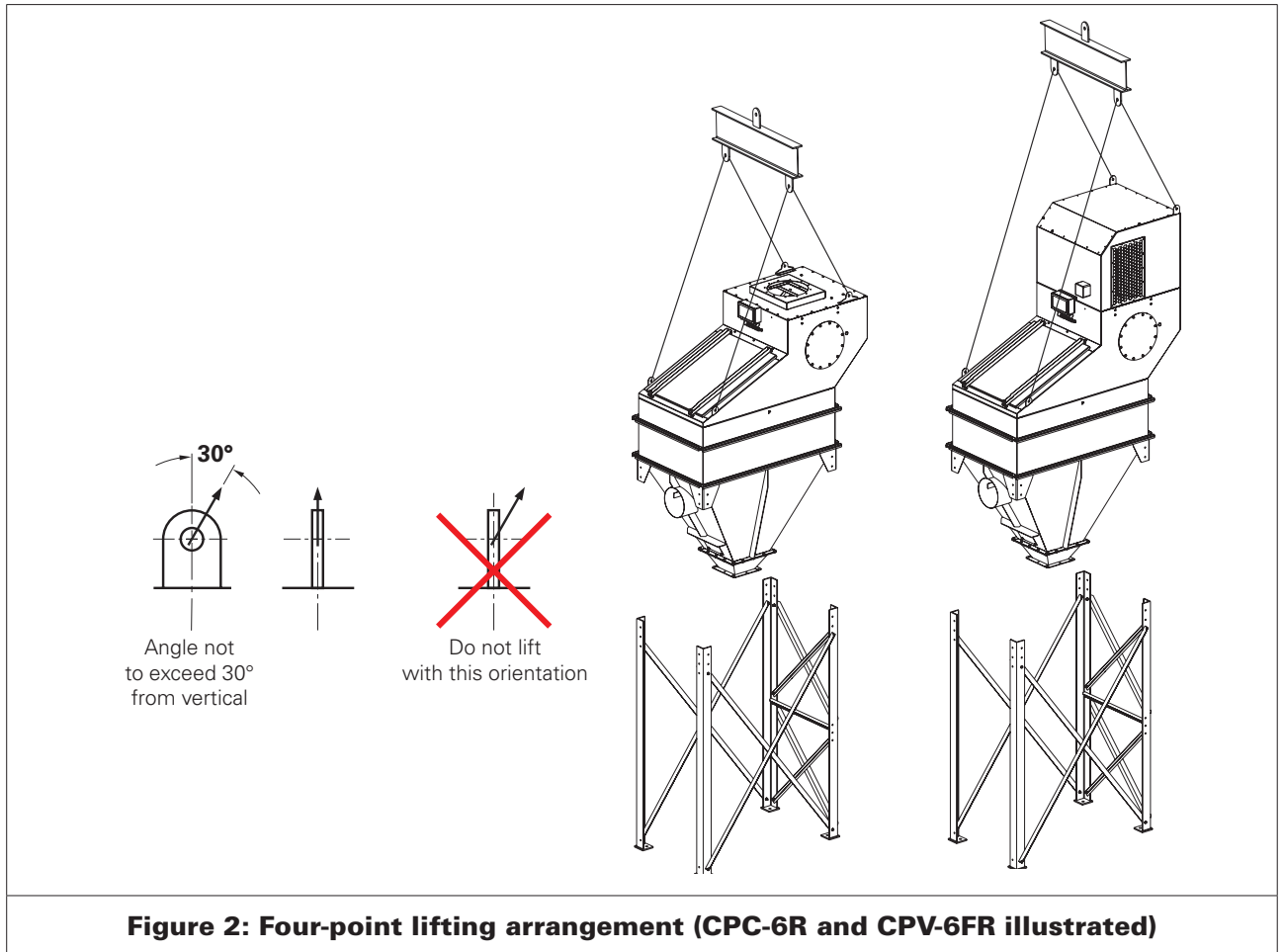
Use clevis connectors, not hooks, on lifting slings.



Use spreader bar to prevent damage to collector casing.



Take centre of gravity into consideration when lifting collector.



CPC-3 and CPC-4 assembly

Refer also to figures 2, 3 and 4.

1. Assemble support by attaching cross bracing to legs using hardware supplied. Do not tighten hardware at this stage.



All bracing require fitting.

2. Lift support assembly into required position and ensure assembly is level.
3. Drill through base holes and insert suitable foundation bolts (if required, details of foundation fixing positions are provided in Publication 3021).



Foundation bolts are not supplied by Donaldson.

4. Tighten foundation bolts, legs and cross bracing.
5. Stand hopper on the discharge end and apply sealant to top flange, each side of hole pattern.
6. Following the general guidance to lifting, lift the collector onto hopper. Align bolt holes in flanges with drift pins, install bolts, washers and nuts and tighten all round to form an airtight seal.
7. Lift and position the collector and hopper assembly onto support. Align bolt holes in hopper gussets/legs with drift pins, install bolts, washers and nuts and tighten.

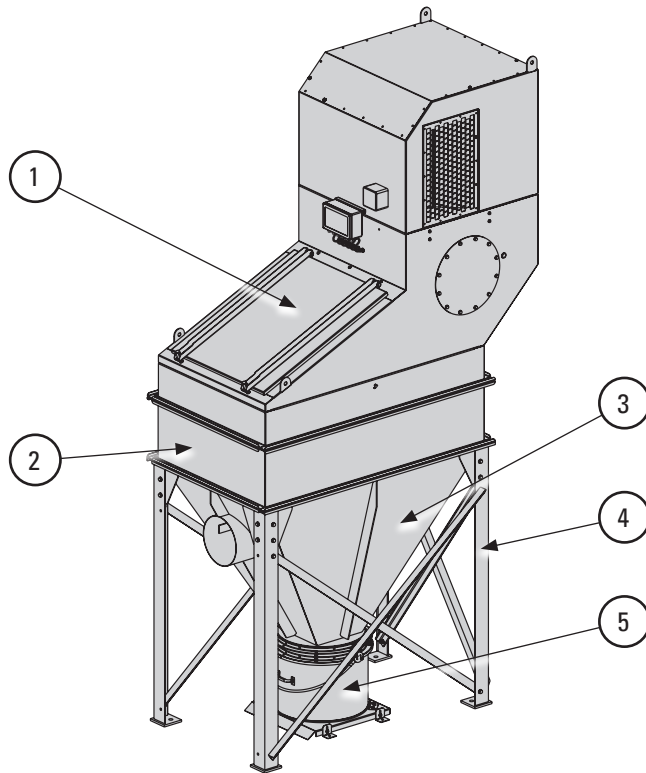


When the collector is fitted with an earthing post, an earthing connection must be made between the collector side panel and the hopper, using the earthing cable provided (refer to figure 5).

8. For collectors with dust container, locate position for dust container base panel, drill through fixing brackets and secure with bolts. Adjust height to provide an effective seal between dust container and sealer gear.

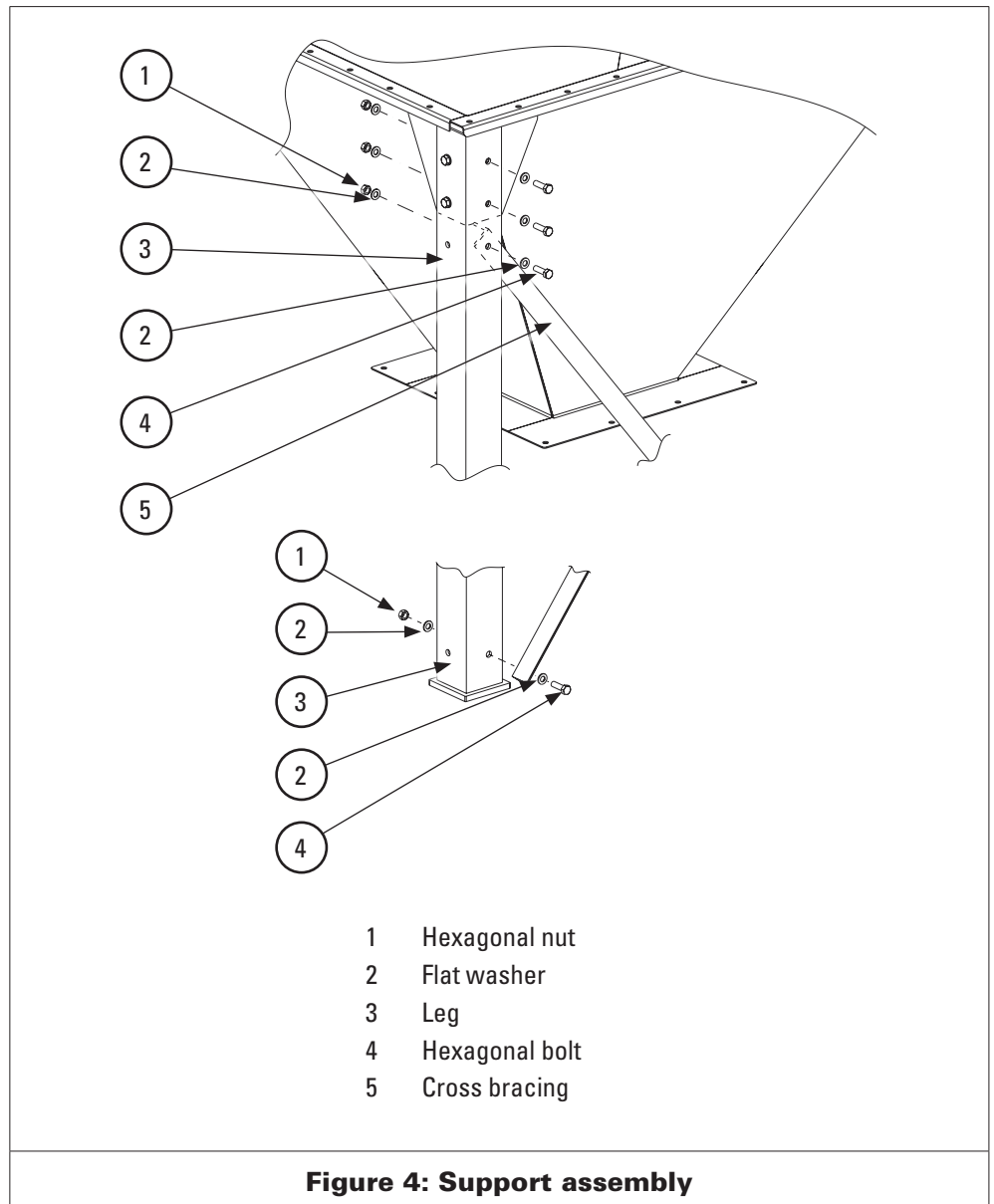


When the collector is fitted with an earthing post, an earthing connection must be made between the base panel and the dust container, using the earthing cable provided.



- 1 Collector
- 2 Dirty air plenum (*separate on PC-6, CPC-8 and CPC-12 only*)
- 3 Hopper
- 4 Support
- 5 Dust container

Figure 3: PowerCore dust collector (model CPV-6F illustrated)



CPC-6, CPC-8 and CPC-12 assembly

Refer also to figures 2, 3 and 4.

1. Assemble support by attaching cross bracing to legs using hardware supplied. Do not tighten hardware at this stage.



All bracing require fitting.

2. Lift support assembly into required position and ensure assembly is level.
3. Drill through base holes and insert suitable foundation bolts (if required, details of foundation fixing positions are provided in Publication 3021).



Foundation bolts are not supplied by Donaldson.

4. Tighten foundation bolts, legs and cross bracing.
5. Apply sealant to top flange of dirty air plenum, each side of hole pattern.

6. Following the general guidance to lifting, lift the collector onto dirty air plenum. Align bolt holes in flanges with drift pins, install bolts, washers and nuts and tighten all round to form an airtight seal.
7. Stand hopper on the discharge end and apply sealant to top flange, each side of hole pattern.
8. Lift the collector and dirty air plenum assembly onto hopper. Align bolt holes in flanges with drift pins, install bolts, washers and nuts and tighten all round to form an airtight seal.
9. Lift and position the collector, dirty air plenum and hopper assembly onto support. Align bolt holes in hopper gussets/legs with drift pins, install bolts, washers and nuts and tighten.



When the collector is fitted with an earthing post, an earthing connection must be made between the collector side panel and the hopper, using the earthing cable provided (refer to figure 5).

10. For collectors with dust container, locate position for dust container base panel, drill through fixing brackets and secure with bolts. Adjust height to provide an effective seal between dust container and sealer gear.



When the collector is fitted with an earthing post, an earthing connection must be made between the base panel and the dust container, using the earthing cable provided.

Compressed air requirements

PowerCore dust collectors require an independent supply of clean, dry, oil-free compressed air. Details of atmospheric pressure and quantity are given in Table 5 (refer to 'Specification' section). A design label is also attached to each manifold. Where an existing factory mains system is to be used it may be necessary to install an additional moisture separator in the supply line to the collector. If a compressor is being installed to supply the collector, then the following conditions should be observed as far as possible:

Type of compressor

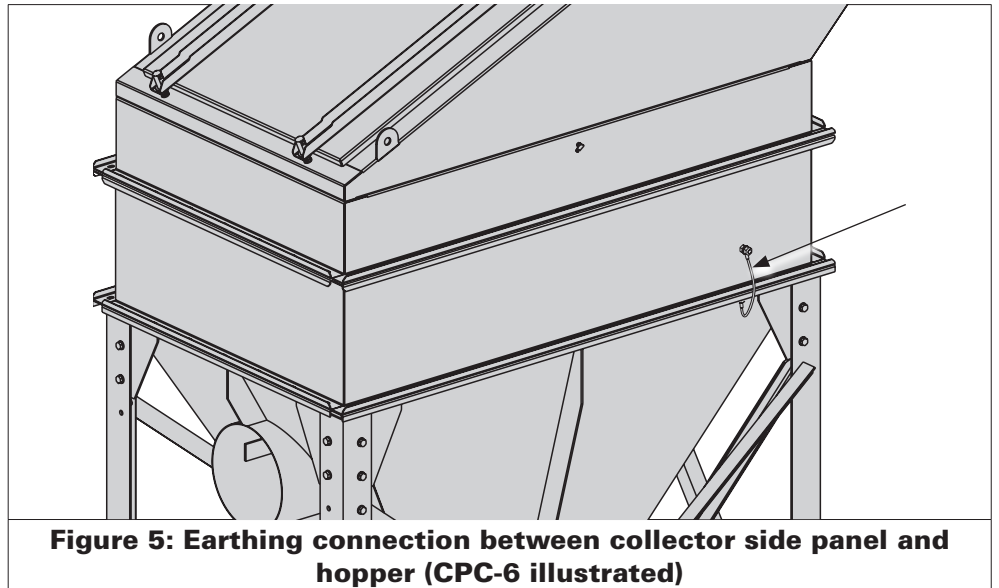
Use a compressor of ample capacity – an overloaded compressor tends to produce excessively contaminated, moisture-laden air.

Location of air intake

Avoid locating the air intake in an excessively polluted area and install an adequate air intake filter. The compressor air intake should be sited, if possible, on the north side of the building – fresh air drawn from the north side is usually cooler and denser, and therefore has a lower moisture content. (South of the equator the reverse will apply).

Layout and installation of air lines

The pipework between compressor and dust collector should be long enough to act as a cooling device for the compressed air. A typical requirement for the smaller installation would be 10m (30ft) of 12mm (½" NB) piping. For further details see Table 5. The piping should be installed to provide a fall in the direction of air flow to assist in the drainage of accumulated moisture. A moisture separator should be provided at the lowest point of the installation.



Pressure relief

The manifold has a maximum operating pressure of 6.2 bar (see Table 4 in 'Specification' section). It is a requirement that adequate precaution is taken to avoid exceeding this pressure. Where a relief valve is supplied by Donaldson this device has a relief rating of 17 dm³/s at 6.9 bar. Extra system relief will be required if the connected supply can exceed this.

Controller



It is a requirement of the Supply of Machinery (Safety) Regulations 1992 to provide adequate isolation and emergency stop facilities. Due to the varied nature of site installations this cannot be provided by Donaldson but instead is the responsibility of the customer.



Always isolate power before opening the controller.

Each CPC dust collector is supplied with a Controller or a Power Box to operate the compressed air cleaning system. The Power Box also operates the fan.



For Controller connections and set-up, refer to Controller manual.

The optional Power Box is supplied separately on CPC-6, CPC-8 and CPC-12 collectors. The Power Box can be attached to either side of the collector using the controller location panel and fixings supplied (refer to Figure 6).



The Power Box must be fitted on the opposite side to the explosion panels on CPC-6, CPC-8 and CPC-12 collectors fitted with explosion relief.

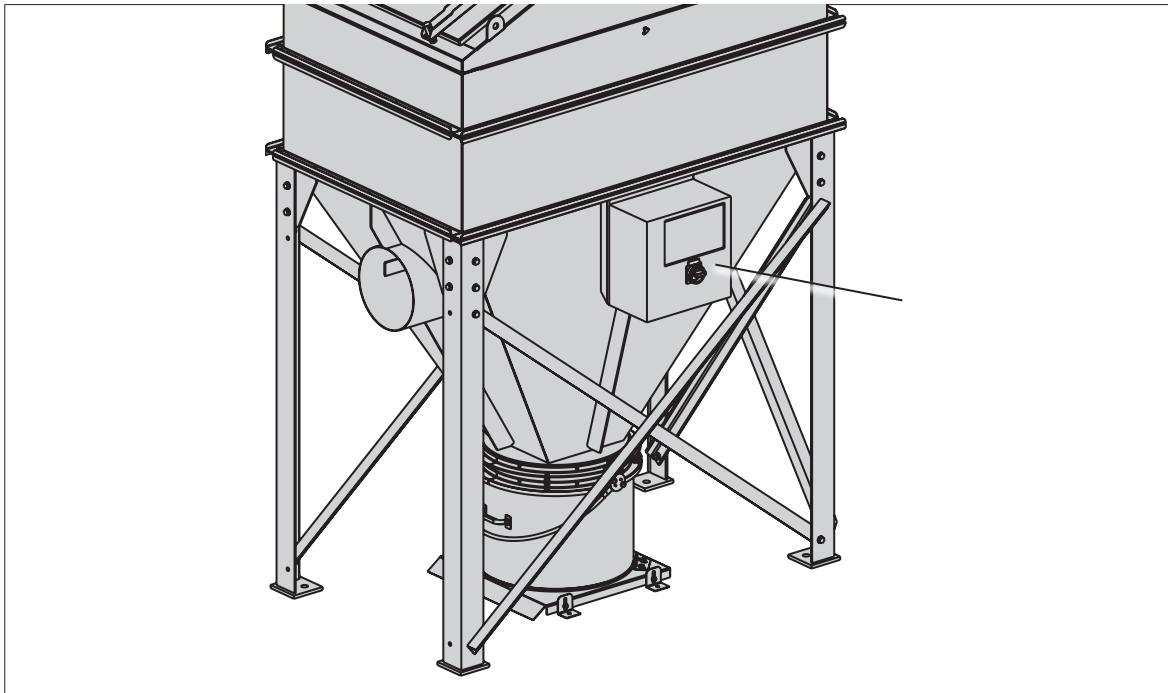


Figure 6: Attaching Power Box to collector (CPC-6 illustrated)

Collectors with integral fan

When the collector is fitted with an Controller, the fan will be wired to the terminal box located on the front of the collector. These terminals will need to be wired to a suitable control panel for the type of fan motor supplied. This control panel should be designed to comply with local legislation for electrical installations (refer also to 'Overload protection' and 'Control of ancillary equipment and interlocks').

When the collector is fitted with a Power Box, the fan will be wired to the Power Box. Connect the incoming three-phase supply to the isolator of the Power Box.



Details of standard fan motor supply voltage are given in Table 6 (refer to 'Specification' section).

Overload protection

All feeder circuits should be adequately protected with suitably-rated fuses and contactors with integral overload protection.

Control of ancillary equipment and interlocks

Discharge equipment such as belt feeders, rotary valve or screw conveyor should be separately controlled but interlocked with the collector controller (refer to figure 7).

If the collector is fitted with a Power Box, this can be configured to operate a complete dust collector system (e.g. fan motor, screw conveyor, rotary valve etc.) and accept inputs from other devices (e.g. PLCs, level probes, explosion relief panel detectors etc.). Where the Power Box is used for the complete system, all necessary interlocks will be built into the system.

The design of the electrical circuitry controlling equipment associated with the collector should be such that breakdown of any one of the associated pieces of equipment does not cause a complete blockage of the collector. For example, should the motor

of a rotary valve fitted to the collector cease to function, the collector housing will gradually fill with dust until completely choked. Failure of the compressor could also cause a similar blockage.

It is therefore important that the starters of all ancillary equipment be interlocked to ensure:

1. Correct starting sequence;
2. Operation of a warning system, or alternatively stoppage of the entire installation in the event of a failure of any of the auxiliary motors;
3. Correct stopping sequence.

Such interlocks are illustrated in figure 7 which also allows for the compressor etc. to operate without airflow through the collector, to facilitate clearance of the collector in the event of blockage due to failure of non-electrical equipment.

EEx controls

When the dust collector is to be installed in a hazardous area where there is any risk of fire or explosion, the collector will be marked for the area(s) it can be safely used within (refer to collector serial nameplate). The collector may be fitted with either of the following control systems:

- **EExd solenoids and remote controller**

When this option is fitted, the dust collector has its solenoid valves in an EExd IIb T6 enclosure mounted on to the collector body. A controller, housed in an IP66 box, is supplied loose. This must be installed in a safe area and connected to the solenoid valves on the dust collector using suitable cabling (not supplied).

It is recommended that cable with a core size of maximum 1.5 mm² is used.



The maximum length of cabling that can be used is 100m.

Instructions for setting up the controller are the same as those for the standard controller.

- **PT Controller**

The PT Controller is a pneumatically operated device which operates the diaphragm valves in sequence, therefore the need for an electrical supply is eliminated.

The controller is supplied complete with air regulator and is normally bracket-mounted directly to the collector.



For PT Controller connections and set-up, refer to Publication 2697.

Antistatic earthing

If the collector is fitted with an earthing post (see the symbol shown) it is particularly important that the earthing post is properly connected to earth, using the fixings provided, to prevent any static build-up.



Collectors with dust containers will have two connection points, located on the collector and the dust container base.

Explosion relief



Explosion panels, if fitted, must be relieved to a safe area in accordance with Factory Inspectorate recommendations. The explosion relief area is suitable for the collector volume only. Fitment of the collector to larger vessels will require additional explosion protection to be fitted to the vessel. This protection should ensure that pressures developed during an explosion are lower than the collector strength. Consult Donaldson for specific collector design pressures. Refer to Table 1 for predicted flame lengths during an explosion.

If providing a facility to shut down the equipment in the event of an explosion, the signal should be taken from the explosion relief panel detection device (refer to figure 8). If the collector is fitted with a Power Box, the signal may be connected to the input circuits of the Power Box.



When connecting to the detection device, the following must be taken into account:

- maximum supply voltage: 30V DC
- maximum current: 100mA / 3W



When the detection device is located in a hazardous area, the electric circuit to the indicator must be intrinsically safe (e.g. by using an isolation amplifier).

**TABLE 1 – PREDICTED FLAME LENGTHS
(calculation based on VDI 3673)**

Type:	CPC-3	CPC-4	CPC-6	CPC-8	CPC-12
Flame length:	8.4 m	9.5 m	12.6 m	13.2 m	15.0 m

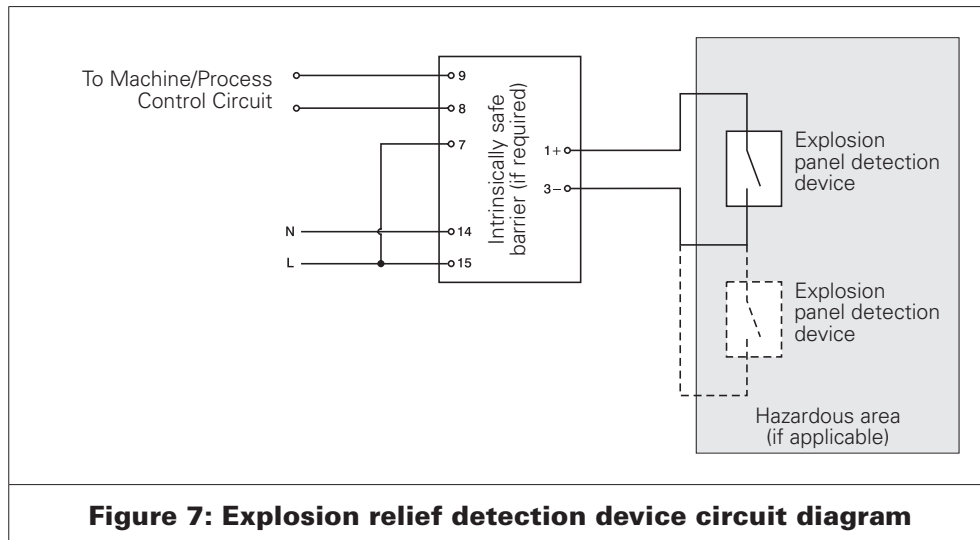


Figure 7: Explosion relief detection device circuit diagram

Installation check list

- Ensure the dust collector is securely bolted to the support structure.
- Ensure the support structure is securely bolted to the floor.
- Ensure compressed air supply is installed correctly and free from leaks.
- Ensure electrical supply is installed correctly and complies to local legislation.

COMMISSIONING



It is a requirement of the Supply of Machinery (Safety) Regulations 1992 to provide adequate isolation and emergency stop facilities. Due to the varied nature of site installations this cannot be provided by Donaldson but instead is the responsibility of the customer.

Installation check list

- Ensure the dust collector is securely bolted to the support structure.
- Ensure the support structure is securely bolted to the floor.
- Ensure all ducting is complete and all detachable panels are in position.
- Ensure collectors fitted with an earthing post are suitably earthed.
- Where fitted, ensure explosion relief panels are venting to a safe area.
- Open the access door(s) and ensure the seal is intact, then close and secure the door(s).
- Ensure controller is connected to the correct voltage and the pulse interval and duration settings are correct. For 24V DC ensure polarity is correct. It is essential that the controller is earthed for both AC and DC connections.
- Ensure electric power is available.
- Ensure the compressed air manifold has sufficient protection for over-pressure.
- Start the compressor and check the air supply is maintained at the recommended pressure.
- If applicable, start up the discharge equipment (e.g. screw conveyor, rotary valve, belt feeders etc.).
- Switch on the controller and check that all valves operate in sequence (listen for exhaust pulses). As each valve operates, the air pressure reading should drop to approximately 50% of the initial setting and then return to the initial value.
- If fitted, start up the main fan and check for correct rotation and the full load current is not exceeded (refer to fan rotation label located on rear panel of fan section).
- Verify operation of the interlocks and audible warning system if fitted.

If any of the above check boxes are not ticked, then the reasons why should be investigated. (Refer to fault location table in 'Maintenance' section).

Start-up sequence

Having completed all the necessary checks, the equipment may be put into operation. A typical installation, as shown in figure 7, should be started up as follows:

1. Start up compressed air supply.
2. Set the equipment being served, if applicable, in motion.
3. Switch on discharge equipment (if applicable).
4. Switch on controller.
5. Start main fan.

Shut-down sequence



At the end of any period of operation it is most important that all residual deposits are cleared from the PowerCore filter packs, casing, discharge hopper and equipment being served. To achieve this, equipment should be shut down in the following order:

1. Stop main fan only, leaving the controller and compressed air supply switched on to allow the collector to be cleaned 'off-line'.



To enable off-line cleaning, refer to controller manual.

2. After 10-15 minutes, switch off the controller and compressor but leave the discharge equipment running to ensure that it is emptied.
3. After a further 5 minutes, switch off the discharge equipment if applicable.



Where the dust being handled has self-heating properties, it is important to remove any deposits in the dust container to reduce the risk of an explosion.

Adherence to the above procedure will ensure that a PowerCore dust collector installation is maintained at optimum efficiency.



On installations where the inlet duct is relatively short, this procedure may result in a dust emission occurring at the inlet and therefore may not be an appropriate procedure if the dust being handled is dangerous. Therefore a Risk Assessment must be carried out to ensure the final procedure is safe.

OPERATION

Principle of operation

Filtering operation (fig. 9a)

Contaminated air from the dust generation source is drawn through the inlet into the collector by the fan. Airflow is directed upwards through the PowerCore filter packs, removing the fine particulate (heavier particulate falls into the discharge hopper). The clean, filtered air passes through the collector and is discharged through the cleaned air outlet.

Cleaning operation (fig. 9b)

At regular intervals, governed by the controller, each PowerCore filter pack receives a short burst of compressed air from an adjacent diaphragm valve. This causes a brief, powerful reversal of airflow through the filter pack, effectively dislodging the dust layer which then falls into the discharge hopper.

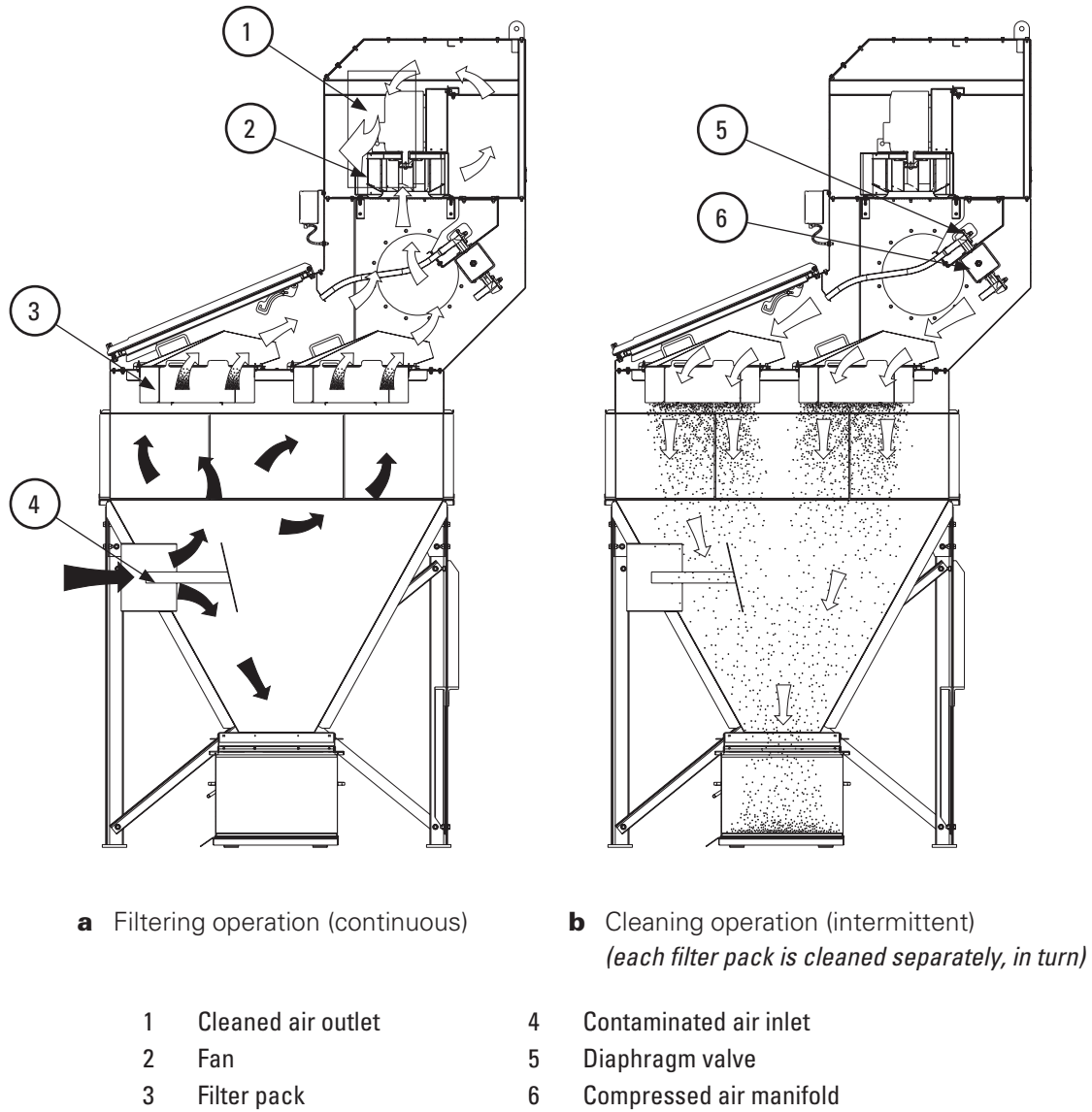


Figure 8: Section through collector showing principle of operation (CPC-6F illustrated)

Dust disposal



For safe handling of the dust container an assessment must be made to satisfy the requirements of the European Directive 90/269/EEC on manual handling.



Dust containers may require regular emptying. If the dust being handled is explosive, then care should be taken to ensure that dust spillage is kept to a minimum to avoid the creation of potentially explosive atmospheres and secondary hazards.

Dust containers should be securely replaced and resealed prior to collector restart. This is a good time to check the dust container for damage, which may lead to a dust leak or flame emission in the rare instance of an internal explosion.

1. Release container by raising sealer gear handle.
2. Remove and empty container.
3. Replace container by sliding back into position.
4. Reseal container by lowering sealer gear handle.

MAINTENANCE



A platform should be used when carrying out maintenance where the position of the technician's feet is greater or equal to 2 metres above ground level.



Before any work is carried out, ensure the equipment is adequately isolated and safe.



Ensure the pneumatic system is fully isolated and depressurised before any work is carried out.



For ancillary equipment not manufactured by Donaldson, refer to manufacturer's instructions.



If it is unavoidable to work on the equipment while a potentially explosive atmosphere is present, care should be taken to avoid introducing ignition sources not present during expected operation. Non-sparking tools should be used.



Access to the dirty air chamber of the equipment may create risks and hazards that under normal circumstances are not present and as such this work must be carried out by competent personnel. These risks include inhalation of dust and potential explosion hazards. Appropriate personal protection equipment (PPE) should be used, e.g. dust mask, safety hat, gloves etc.



The explosion relief panel, if fitted, should be replaced immediately if deformed in any way.



In order to maintain the original collector specification and to ensure the same level of safety, only genuine spare parts should be fitted.



Every care has been taken to avoid the risk of ignition of a flammable atmosphere. The measures taken to avoid ignition should not be altered since this may result in unsafe operation. Particular care should be taken during maintenance and component replacement to ensure the same level of safety is maintained. When replacing fan impellers, avoid any rubbing of components (to prevent mechanical sparks).



Care should be taken during cleaning and maintenance to avoid creating static discharges that have the potential to ignite a flammable atmosphere.



When carrying out maintenance always follow typical best practice to local regulations (e.g. TRGS 560).

Routine inspection

To maintain the optimum performance of any dust collector, a routine inspection should be made to minimise down-time in the event of equipment malfunction, particularly on continuous performance applications and to ensure the equipment is maintained to its original supply condition.

Any abnormal change in pressure differential across the filter packs indicates a change in operating conditions and a fault to be rectified. For example, a prolonged stoppage of compressed air will cause an excessive build-up of dust on the filter packs, resulting in a greatly increased pressure drop.

After the fault has been rectified, resumption of compressed air cleaning will usually return the filter packs to normal efficiency. However, it is advisable to operate the controller in still-air conditions for a short period to dislodge any accumulated dust before putting the collector into operation.

Filter pack resistance can be checked by connecting a U-tube manometer or differential-type pressure gauge to tapping points on the collector body (see figure 10). This will give a continuous indication of the state of the filter packs. Once running, the operating resistance will be relatively stable, the actual value depending on the air volume and the characteristics of the dust being handled.



Ignition minimising fans are fitted with a lining inside the casing. As this may only offer protection for a limited period, any upset condition leading to rubbing, the fan must be switched off immediately and the condition corrected.



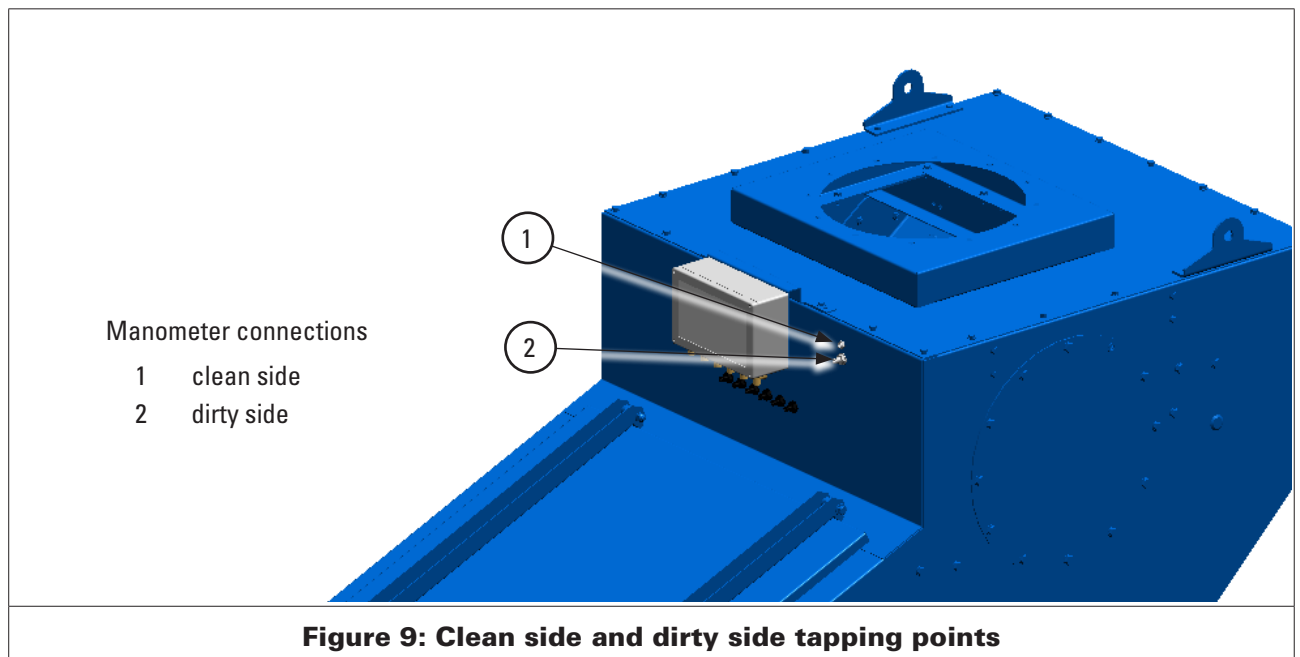
It is recommended to periodically inspect the general casing integrity and support structure.



Do not operate above recommended compressed air pressure. Excessive pressure will reduce the working life of components.

Servicing schedule

A record of all pressure checks should be kept in a log book to aid the speedy diagnosis of faulty operation.



Weekly

1. Open the valve at the bottom of the moisture separator bowl and allow the collected water to drain off, then close the valve.
2. Connect a manometer to tapping points (refer to Routine inspection) and measure the pressure drop across the filter packs.

Monthly

Check operation of solenoid and diaphragm valves.

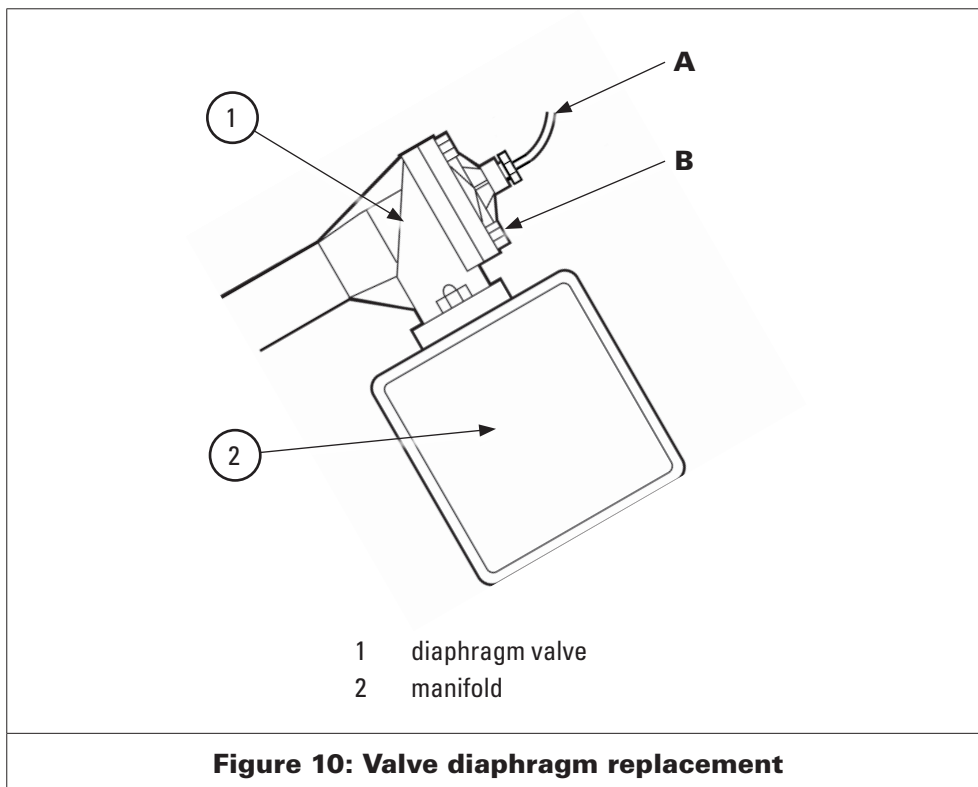


It may be necessary to check the operation of the valves while the system is pressurised. Care should be taken to avoid injury.

If it is found necessary to replace a diaphragm, use the following procedure (see figure 11):

Use service kit available from Donaldson.

1. Remove nylon tube (A) by pulling out from valve.
2. Remove the hexagon head set screws and shakeproof washers securing the valve bonnet (B).
3. The diaphragm and spring (if fitted) can now be replaced, first ensuring the 'bleed' hole pin is not blocked.
4. Ensure that diaphragm fits over 'bleed' hole pin and that the nylon sealing washer is inside throat of valve.
5. Position spring (if fitted) inside bonnet recess.
6. Refit bonnet ensuring spring (if fitted) locates over diaphragm disc shoulder and bonnet locates over 'bleed' hole pin.
7. Refit and tighten the hexagonal head set screws and shakeproof washers.
8. Push-fit nylon tube back into valve.



Six-monthly

The fan impellor has been dynamically balanced and the fan assembly vibration level should be in line with category BV-3, ISO 14694. An assessment of vibration should be made every six months, or after a significant emission, or after any misuse and a record kept of measured values. Excessive vibration levels should be investigated and corrected immediately.



Vibration monitoring is mandatory on category 2G, 3G and 2D fan assemblies.

Annually

1. Moisture separator – Isolate the compressed air supply; remove and clean the filter element.
2. Air manifold – Having isolated the compressed air supply, remove the drain plug and air inlet connections and clean out any accumulated sludge and inspect to any current local legislation.



It may be necessary to remove a diaphragm valve for internal inspection purposes.

3. Doors – Check the dust seals on all access doors for damage or ageing and ensure that they are properly seated to prevent entry of water. This is particularly important where the collector is located outside or in a wet atmosphere.



Faulty seals must be replaced.

4. Flameproof maintenance – It is important that all flameproof enclosures, motors and cable glands are inspected for corrosion and tightness on an annual basis.



In particularly aggressive environments, this period should be more frequent.

5. Antistatic earthing (if fitted) – Check collector earthing continuity.
6. Explosion risks – Check measures taken to avoid ignition sources are still in place.
7. Fan maintenance – Open access door(s) and, by looking through fan inlet eye, inspect fan thoroughly. If necessary, remove all residual dust accumulation. (Although the fan is located on the clean side of the collector, it is possible for low quantities of dust to migrate through the filter media).



The fan should be inspected immediately after any period of significant dust emission, i.e. due to damaged filter media or seal etc.



The fan should be inspected immediately if there is any unexpected noise, temperature or vibration.



The fan should be inspected every twelve months or immediately following any misuse.



If inspection reveals any damage then the fan must not be put back into service until properly repaired or replaced.

Filter pack replacement



Use safety and protective equipment when removing contaminants and filter packs.



Dirty filter packs may be heavier than they appear.



Take care when removing filter packs for inspection.



Damaged filter packs must be replaced.



Do not drop filter packs.

Refer also to figure 12.

1. Turn off and isolate any air movement equipment associated with the process (e.g. fan) and check clean air chamber is at atmospheric pressure.
2. Isolate controller and/or compressed air supply.
3. Open access door by releasing fasteners. Swing door fully open and engage door locking mechanism.
4. Release filter pack retainer wing nuts and washers. Remove filter pack retainers.
5. Remove each filter pack by lifting straight up.
6. Place filter pack into a sealable bag and dispose of the filter pack properly.



If in doubt regarding the safe disposal of the used filter pack, consult your local regulations.

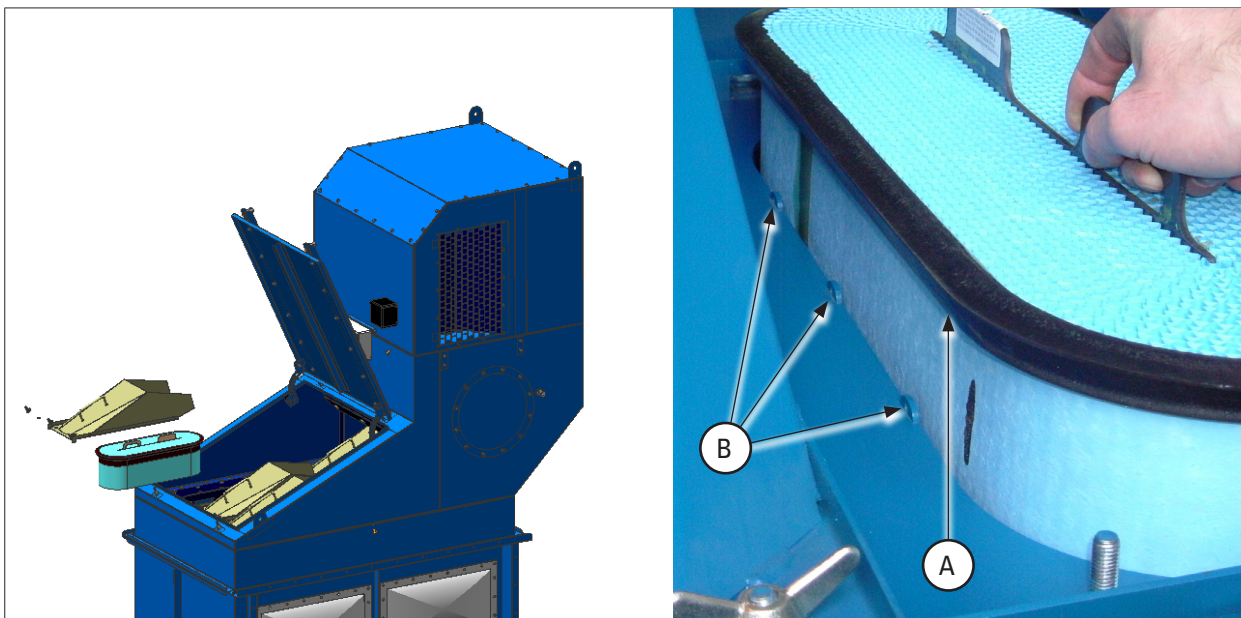


Figure 11: Filter pack replacement (CPC-6F illustrated)

7. Clean surface around openings where filter packs are seated to ensure a good seal.
8. Insert new filter packs into place, ensuring seal (A) overlaps the six filter pack locators (B).
9. Replace filter pack retainers, replace washers and tighten wing nuts so that each filter pack seal is seated firmly.
10. Disengage access door locking mechanism, then close and fasten access door.

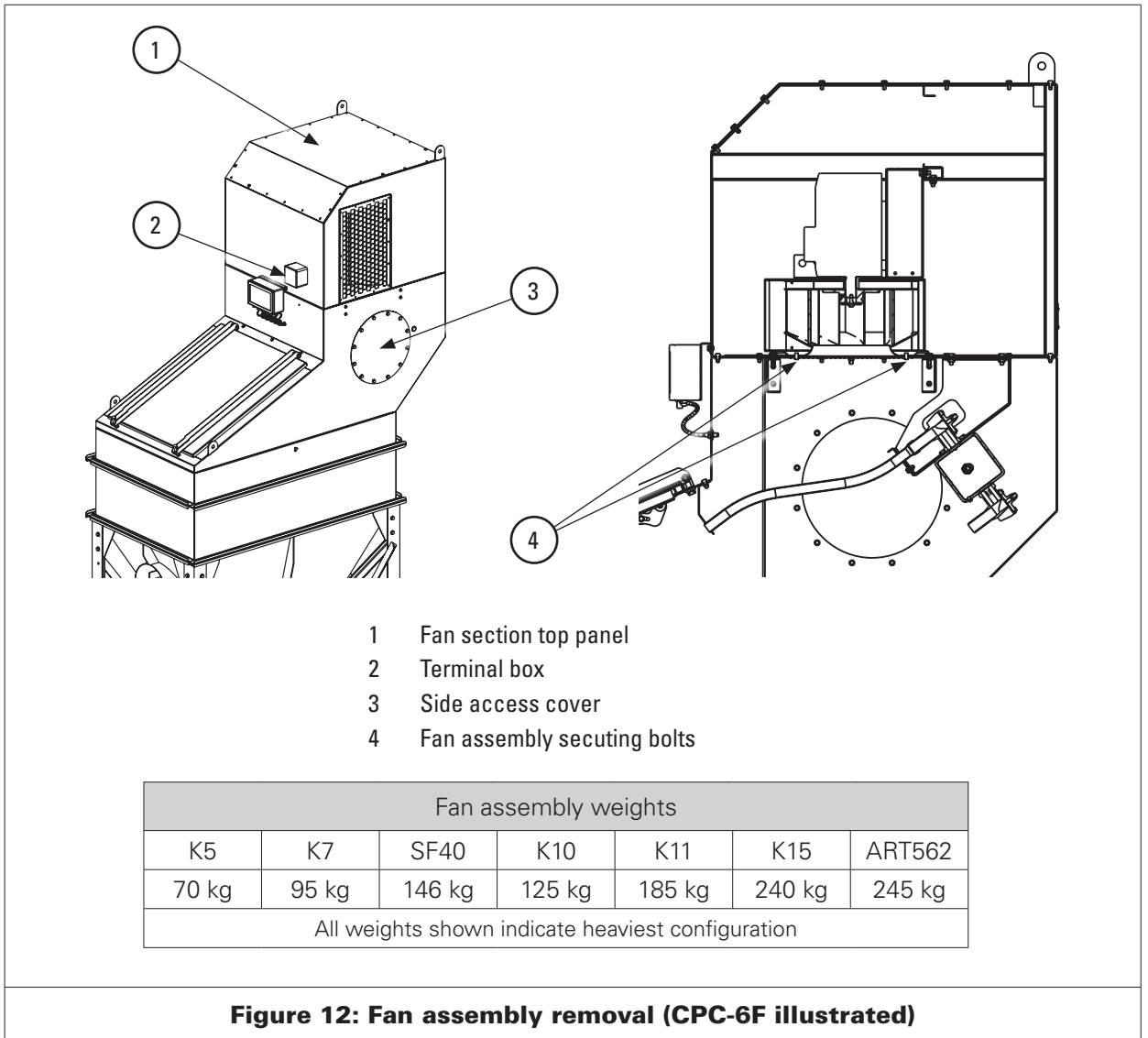
Fan assembly removal/replacement



Isolate electric power supply.

Refer also to figure 12.

1. Disconnect electrical cables from terminal box.
2. Remove fan section top panel.
3. Remove side access cover.
4. Remove fan assembly securing bolts from inside clean air chamber.
5. The fan assembly can now be removed using a suitable lifting arrangement.



Renewing fan impeller and/or motor:

Refer also to Table 2.

1. Make a note of the distance from either impeller back plate to fan case (preferred) or inlet eye to impeller front plate, as this will assist with replacement. If required, refer to Donaldson for exact dimensions.
2. From front of fan assembly (non motor end) remove impeller inlet eye from fan casing by removing outer circle of bolts and pulling away the plate.
3. Undo grub screw that holds hub onto motor shaft.
4. Undo and remove bolt in end of motor shaft holding the hub retaining washer.
5. Remove motor key by easing it out from keyway.
6. Using the location grooves machined into hub, pull impeller from motor shaft and out through the front of fan case.
7. Slide spacer off motor shaft.
8. Remove the 4 nuts, bolts and washers holding motor to pedestal.
9. The motor can now be removed using suitable lifting equipment, taking care not to damage sealing washer placed between motor endplate and fan casing.
10. Place the new motor on support pedestal and locate rubber sealing washer between fan case and motor.
11. Position motor on pedestal and secure loosely by replacing the 4 nuts, bolts and washers.
12. Locate motor key into keyway on motor shaft.
13. Push motor shaft spacer onto motor shaft.
14. Align keyway of impeller hub onto key and slide impeller onto motor shaft.
15. Replace hub retaining washer and shakeproof washer. Apply thread lock to motor end shaft bolt and replace bolt, ensuring impeller is pushed back onto spacer.
16. Apply thread locks to grub screws holding hub and tighten into place.
17. Locate impeller, according to the dimension taken during removal, by moving motor along pedestal, ensuring motor remains square to fan case.
18. If the measurement was taken from impeller back plate to fan case, adjust to suit and tighten motor fixing fasteners through pedestal and motor feet. Replace inlet eye, using a bead of sealant between the plate and fan case and replace outer circle of bolts.
19. If the measurement was taken from inlet eye to impeller front plate, then replace inlet eye, using a bead of sealant between the plate and fan case and replace outer circle of bolts. Adjust impeller to suit and tighten motor fixing fasteners through pedestal and motor feet.
20. If a measurement was not taken, then replace inlet eye, using a bead of sealant between the plate and fan case and replace outer circle of bolts. Adjust impeller so that there is approximately 2 mm clearance between inlet eye and front of impeller and tighten motor fixing fasteners through pedestal and motor feet. For ignition minimising fans the minimum clearance must be >1% of the relevant contact diameter.
21. Rotate impeller by hand, adjusting where necessary, to ensure that impeller runs freely.

Replacing fan assembly:

If changing fan assembly for a different type, e.g. K5 to K7, ensure the associated fan mounting plate and fan support channels are used. If required, any necessary electrical items should be resized.

1. Lift fan assembly into position.
2. Loosely replace securing bolts.
3. Ensure fan assembly is correctly positioned, then tighten bolts.
4. Connect electrical cable to motor.
5. Feed motor cable through front panel and reconnect electrical cables to terminal box.
6. Replace fan section top panel.



Before replacing top panel, apply 5 mm bead of sealing compound along each side of fixing holes.

7. Replace side access cover.



Before replacing side access cover, apply 5 mm bead of sealing compound along each side of fixing holes.

8. Switch on electric power.
9. Ensure correct fan rotation (refer to fan rotation label located on rear panel of fan section).

TABLE 1 – TORQUE VALUES FOR BOLTS WITH ISO METRIC THREAD

Nominal diameter (mm)	Thread pitch (mm)	Stress area (mm ²)	Torque value* (Nm)		
			Grade 8.8	Grade 10.9	Grade 12.9
8	1	20.1	10.4	15.3	17.9
7	1	28.9	17.2	25	30
8	1.25	36.6	25	37	44
10	1.5	58	50	73	86
12	1.75	84.3	86	127	148
14	2	115	137	201	235
16	2	157	214	314	368
18	2.5	192	306	435	509
20	2.5	245	432	615	719
22	2.5	303	592	843	987
24	3	353	744	1060	1240
27	3	459	1100	1570	1840
30	3.5	561	1500	2130	2500

* For nuts and bolts to ISO 4017.

TABLE 2 – FAULT LOCATION

Symptom	Possible cause	Action
Excessive pressure differential.	Compressed air malfunction.	If compressor stopped, rectify compressor fault; check interlocks; check motor and supply; check drive.
		If compressor OK, check pulses at manifold pressure gauge.
		Clean filters, dismantle and clean moisture separator.
		Check for excessive water or oil in compressed air supply, and possible accumulation in manifold.
	No pulses of air to valves.	Refer to controller manual supplied with dust collector.
	Filter packs blocked.	Run filter packs clear*, then remove each filter pack in turn and renew any that are damaged.
	Motor speed low.	Check line voltage, phases, fan motor connections. For Star/Delta applications, check motor is in Delta.
Incorrect fan motor rotation.	Check electrical connections and transpose if necessary.	
Insufficient airflow	Fan motor stopped.	Check motor supply overloads, fuses and interlocks (if fitted).
		Check motor connections and windings.
	Filter packs blocked.	Run filter packs clear*, then remove each filter pack in turn and renew any that are damaged.
	Ducting blocked.	Check throughout and clear.
Visible effluent in clean air outlet.	Filter packs not properly sealed.	Ensure filter pack retainers are fitted securely.
	Damaged filter pack.	Damaged filter bag can be identified by the dust present in clean air chamber. Withdraw filter pack and renew bag.

*To run filter packs clear, allow the controller to perform several complete cleaning cycles before switching off compressor etc.



This procedure is not recommended where explosion panels are fitted, as damage could result to the membrane. In such cases consult with Donaldson.

SPECIFICATION



For Controller specifications, refer to Controller manual.

TABLE 4 – COMPRESSED AIR MANIFOLD DESIGN DETAILS

Design pressure:	6.9 bar (100 psig)
Maximum operating pressure, PS:	6.2 bar (90 psig)
Test pressure:	10.35 bar (150 psig)
Design temperature:	-30° to +150°C
Maximum rating of pressure relief device:	17 dm ³ /s at 6.9 bar (not supplied as standard)
Manifold volume:	12 litres (CPC-3 and CPC-6) 17 litres (CPC-4 and CPC-8) 27 litres (CPC-12)
Product of pressure and capacity:	74.4 bar litres (CPC-3 and CPC-6) 74.4 bar litres (CPC-4 and CPC-8) 105.4 bar litres (CPC-12)
Material used for manifold construction:	Structural hollow section
Minimum metal thickness before manifold requires special inspection:	To improve corrosion resistance the manifold is painted externally and internally using cathodic electrocoat. 5.5 mm

1 bar = 10⁵ Pa

TABLE 5 – COMPRESSED AIR REQUIREMENTS

Collector type	Working compressed air pressure ^a		Atmospheric air volume- F.A.D. at 12 sec. intervals ^b		Pulse duration	Minimum pipe diameter ^c
CPC-3 and CPC-6	6.2 bar	90 psig	16 m ³ /h	9.4 cfm	100 ms	1/2" NB (12)
CPC-4 and CPC-8	6.2 bar	90 psig	20 m ³ /h*	11.8 cfm*	100 ms	1/2" NB (12)
CPC-12	6.2 bar	90 psig	25 m ³ /h	11.8 cfm	100 ms	1/2" NB (12)

^a Normal operating pressure. ^b Recommended initial settings; these may be varied with experience.

^c Sizes suitable for runs of pipe up to 30 m (100ft) in length; for longer runs consult with Donaldson.

*Estimated data

1 bar = 10⁵ Pa

TABLE 6 – STANDARD FAN MOTOR SUPPLY VOLTAGE DETAILS

To comply with European standards the motor nameplate will display the following:

3 Phase / 50 Hz (IEC 60034-30)

kW	Nameplate details	Range
0.75 – 1.5	230/3/50 D	220-240 D
	400/3/50 Y	380-420 Y
2.2 and above	400/3/50 D	380-420 D
	690/3/50 Y	660-690 Y

3 Phase / 60 Hz*

kW	Nameplate details	Range
0.75 – 1.5	250-280/3/60 D	250-280 D
	440-480/3/60 Y	440-480 Y
2.2 and above	440-480/3/60 D	440-480 D

*Some motors will be fitted with a second nameplate displaying 60 Hz details



The details above may not apply to non-standard motors.

SPARE PARTS

Item	Description	Part number	※
	Filter pack assembly		
1	Filter pack, Ultra-Web®	P032422	✓
1	Filter pack, Ultra-Web® antistatic [‡]	P032643	✓
2	Filter pack retainer kit	1A 6511 7018	
	[‡] Fitting antistatic filter packs will not provide a full earthing arrangement without making an earthing connection using the earthing post(s)		
	Fan assembly		
3	Fan motor [†] , K5 fan, 2.2 kW, IP55, 380-420V/660-690V 50 Hz	1A 2757 2264	
3	Fan motor [†] , K7 fan, 3.0 kW, IP55, 380-420V/660-690V 50 Hz	1A 2757 2268	
3	Fan motor [†] , SF40 fan, 4.0 kW, IP55, 380-420V/660-690V 50 Hz	Consult Donaldson	
3	Fan motor [†] , K10 fan, 5.5 kW, IP55, 380-420V/660-690V 50 Hz	1A 2757 2271	
3	Fan motor [†] , K11 fan, 7.5 kW, IP55, 380-420V/660-690V 50 Hz	1A 2757 2276	
3	Fan motor [†] , K15 fan, 11.0 kW, IP55, 380-420V/660-690V 50 Hz	1A 2757 3280	
3	Fan motor [†] , ART 562 fan, 11.0 kW, IP55, 380-420V/660-690V 50 Hz	Consult Donaldson	
4	K5 fan assembly (including motor [†])	1A 3321 9208	
4	K7 fan assembly (including motor [†])	1A 3321 9503	
4	SF40 fan assembly (including motor [†])	1A 6521 9000	
4	K10 fan assembly (including motor [†])	1A 3321 9569	
4	K11 fan assembly (including motor [†])	1A 3321 9429	
4	K15 fan assembly (including motor [†])	1A 3321 9390	
4	ART 562 fan assembly (including motor [†])	1A 6521 9002	
	[†] For other types/specifications/motors for hazardous areas consult Donaldson		
5	Impellor, K5 fan – item not illustrated	1A 3321 9138	
5	Impellor, K7 fan – item not illustrated	1A 3321 9464	
5	Impellor, SF40 fan – item not illustrated	Consult Donaldson	
5	Impellor, K10 fan – item not illustrated	1A 3321 9557	
5	Impellor, K11 fan – item not illustrated	1A 3321 9414	
5	Impellor, K15 fan – item not illustrated	1A 3321 9365	
5	Impellor, ART 562 fan – item not illustrated	Consult Donaldson	
	Access door assembly		
6	Access door	CPC-3 CPC-4 CPC-6 CPC-8 CPC-12	1A 6511 3023 1A 6511 3025 1A 6511 3027 1A 6511 3029 1A 6511 3031
7	Neoprene seal, access door	CPC-3 CPC-4 CPC-6 CPC-8 CPC-12	1A 6519 3035 1A 6519 3037 1A 6519 3039 1A 6519 3041 1A 6519 3043
<p>※ Recommended spares for up to two years' operation</p> <p>Damaged safety related parts and safety components should be replaced only with genuine original spare parts otherwise CE mark will become invalid</p>			

Item	Description	Part number	*	
7	Silicone seal, access door	CPC-3 CPC-4 CPC-6 CPC-8 CPC-12	1A 6519 3036 1A 6519 3038 1A 6519 3040 1A 6519 3042 1A 6519 3044	4 ✓ ✓ ✓ ✓
8	Door fastener		1A 3111 3003	
	Controller			
9	For controller spares information refer to Publication 2699 for IPC or IPC (ΔP) Controller and Publication 262-3143 for TCB			
	Compressed air assembly			
10	Diaphragm valve		1A 3189 9011	
11	Diaphragm valve service kit – item not illustrated		1A 2565 3204	✓
12	Gasket, diaphragm valve – item not illustrated		1A 3189 0066	✓
	Dust container assembly			
13	Dust container		1A 6341 1001	
14	Dust container sealer gear assembly (with neoprene seal) – includes items 15 and 16		1A 2141 2046	
14	Dust container sealer gear assembly (with silicone seal) – includes items 15 and 16		1A 2141 2042	
15	Canvas sleeve, dust container sealer gear		1A 2149 2025	✓
16	Neoprene seal, dust container sealer gear		1A 2149 2047	✓
16	Silicone seal, dust container sealer gear		1A 2149 2050	✓
	Explosion relief assembly			
17	Explosion relief panel (complete with detection device)	CPC-3, -4, -6 and -8 CPC-12	1A 2811 0114 262 2322	
<p>*: Recommended spares for up to two years' operation Damaged safety related parts and safety components should be replaced only with genuine original spare parts otherwise CE mark will become invalid</p>				