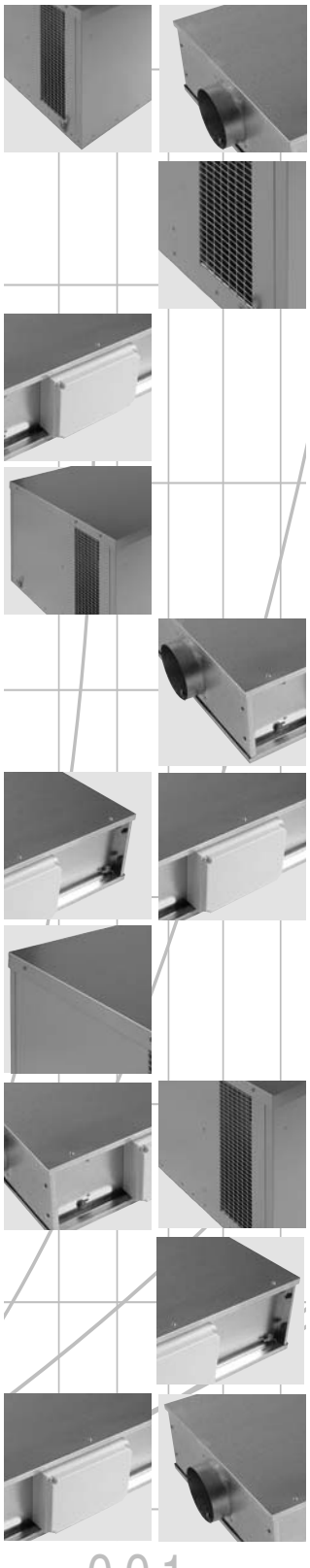
Commissioning of Ecosmart Constant Pressure fan and CVD Dampers



Introduction

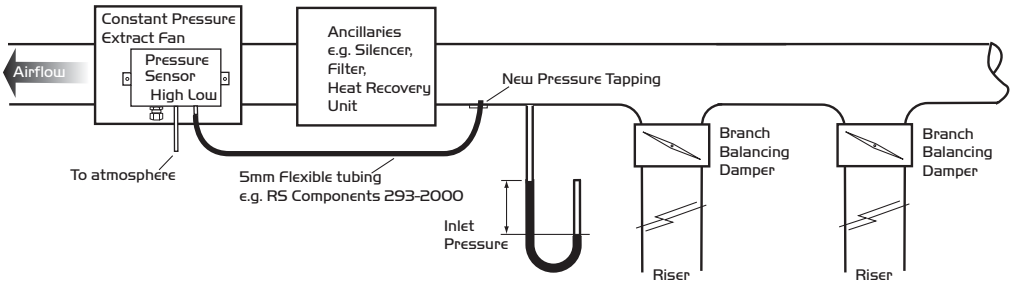
This guide covers the set up procedures needed for the Ecosmart constant pressures fans and the associated CVD dampers. It must be used in conjunction with normal good commissioning practices.

Overall view of commissioning sequence (specific items will be discussed further)

a) Check the fan installation is secure
b) Check the ductwork system is secure and there are no obstructions and leaks in the ducts
c) Check the electrical wiring is in a safe state and the fan is ready to run
d) Set up the constant pressure fan and target pressure (see section 1)
e) Set the trickle and boost control pots of all the CVD dampers at each room to boost flowrate (see section 2)
f) Proportionally balance the risers
g) Check and adjust the boost flowrate of CVD damper (see section 3)
h) Check and adjust the operating pressure across the CVD damper (see section 4)
i) Set the trickle pot of all the CVD dampers at each room to trickle flowrate (see section 5)
j) Check and adjust the trickle flowrate of the CVD damper (see section 5)

1.Set up the constant pressure fan and target pressure

Figure 1.



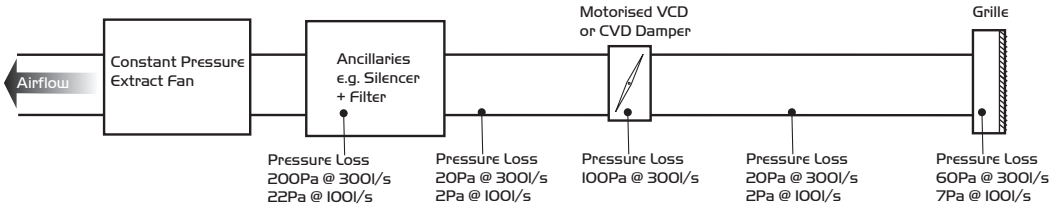
Nuaire's Ecosmart constant pressure fans (ESTCP & ESXCP) are designed as extract fans and they are factory set to control the static pressure at the fan inlet. Although this configuration is suitable for the majority of applications, it is not suitable where ancillaries with large pressure losses are fitted to the fan's inlet. When this situation occurs on site, the pressure tapping connected to the low side of the pressure sensor must be moved to a location upstream of the ancillaries as shown in figure 1. Failure to make this change will result in the very high pressure being applied to the volume control damper when most of the dampers are in the trickle position.

This high pressure can cause a number problems including;

- Cause the pressure applied across the CVD dampers to exceed their design limits
- Cause whistling and possibly over-ventilation if other motorised dampers are used

This situation can be illustrated by a simple example below.

Figure 2.



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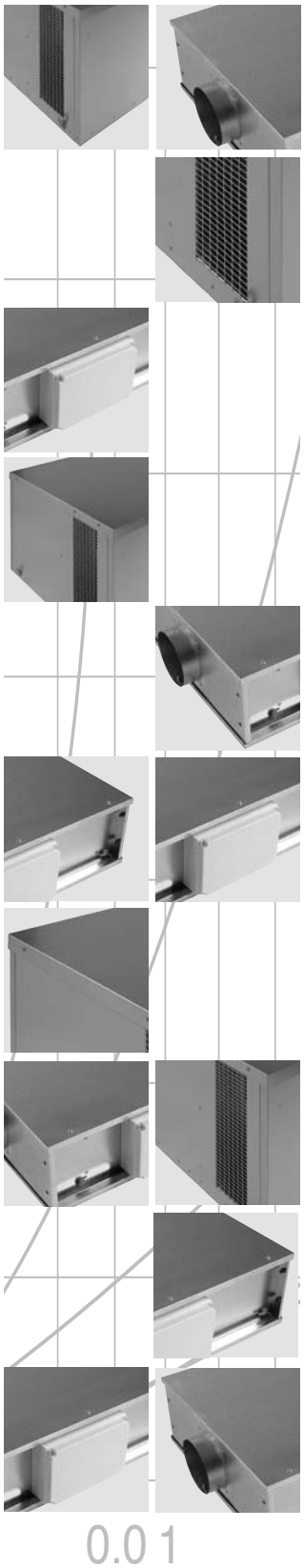


Trickle flowrate 100l/s

Boost flowrate 300l/s

If the fan in figure 2 is set up to control the pressure at the fan inlet, the pressure setting should be 400Pa in order to produce the boost flowrate.

When the damper moves to trickle position, the pressure drop across the silencer and filter will drop to 22Pa. The combined pressure drop of the ducting and grille would be 11Pa. Since the fan will continue to produce 400Pa at its inlet which means the damper has to cope with 367Pa. However, if the pressure tapping is moved to the inlet side of the ancillaries as suggested, the pressure setting would be 200Pa to produce the boost flowrate.

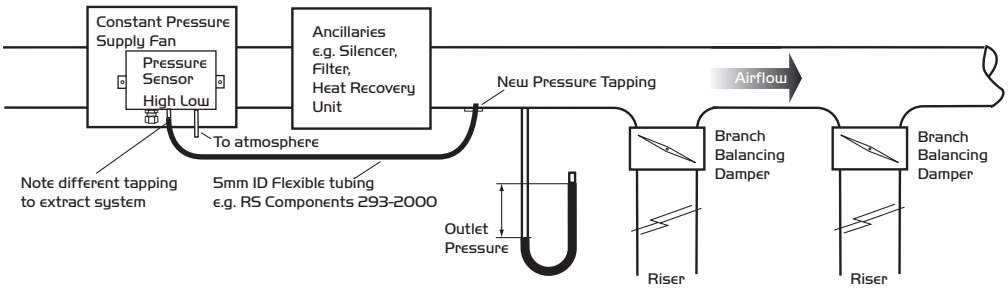
At trickle, the pressure drop across the damper would rise from 100Pa to 189Pa.

Constant pressure fans as supply fans

It is possible to re-configure the fans for supply application. Similar guidelines relating to ancillaries still apply but on the discharge side of the fan. Please see figure 3 for details.

It is possible to order a fan from Nuaire pre-configured as a supply fan. Please note this would be set up to control the pressure at the fan outlet. If there are ancillaries fitted to the fan outlet, the same procedure as shown in figure 3 would be applicable.

Figure 3.



Setting the target control pressure

The target pressure of the fan can be set when the pressure tapping is located at the correct position.

Start the fan running and open the fan commissioning panel; please see the installation manual of the fan for details. Drill a small hole near the position of the pressure tapping and insert the measurement probe of a suitable pressure gauge. Adjust the pressure control pot of the fan until the gauge shows the specified target pressure as given by the system designer. Please note it may take up to 30 seconds for the fan to settle into a new pressure setting. If the target pressure is not known, use the following as a starting point.

- System with longest duct run of up to 60m – set target pressure to 200Pa
- System with longest duct run of more than 60m – set target pressure to 250Pa

Recommended maximum target pressure for CVD100 and 125 is 270Pa.
Recommended maximum target pressure for CVD150 and 200 is 300Pa.

2. Set up the v olume contr ol damper s for eac h r oom

Please follow conventional procedure when motorised volume control dampers are used to control the airflow.

Please follow the following procedure for Nuaire CVD dampers.

Check that the CVD damper is fitted in the correct orientation; note the airflow direction arrow.

Ensure power is connected to the CVD damper.

Adjust the boost setting to the desire valve.

Switch on the damper's mains supply and trigger the CVD damper to boost setting using the switched live or PIR.

Alternatively - set BOTH trickle and boost control potentiometers to the target boost flowrate using the markings around the potentiometers as a guide. Setting both pots eliminates the need to maintain a boost signal at the damper.

Set the boost run on timer and leave the damper powered up.

Repeat for all other dampers in the system.

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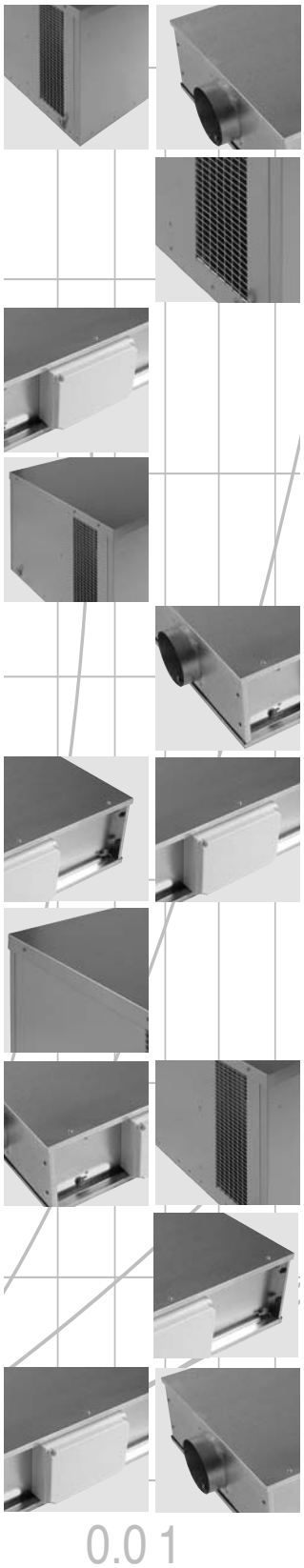

The risers are now ready to be proportionally balanced when all the dampers have been set. Check the static pressures at the top of each riser are consistent. Adjust the balancing dampers to ensure adequate pressure is available at each riser.

3. Check and adjust the boost volume flowrate of CVD damper

Measure the airflow at the grille in the room using a suitable instrument; e.g. a calibrated hood anemometer. Since the calibration marking on the CVD damper were based on laboratory set up, the actual site conditions may cause these to drift. Therefore it may be necessary to adjust the potentiometer setting up or down slightly to achieve the target flowrate. Be sure to move both trickle and boost pots together.

If the damper is under-performing even with the pot at its maximum position, this may be due to the site condition or insufficient static pressure. Check the pressure across the damper.

If the damper is slightly down on duty due to lack of pressure this should not cause a problem when the system is operating normally; i.e. with only some dampers in boost mode. In normal operation, the losses in the ductwork will be lower and there should be adequate pressure across the damper to provide the desired duty.

4. Check and adjust the operating pressure across the CVD damper

Check the differential across the CVD damper; especially the ones nearest to the fan and the ones failing to produce the desired airflow.

The pressure across the damper should be the nominal design pressure as given in table I below. If the pressure is slightly lower than the nominal value but the damper is delivering the correct airflow; this is acceptable.

If the pressure is higher than the maximum allowable value (at boost) for the damper then adjustment is needed; see below. This The maximum allowable pressure is set at 30Pa below the maximum pressure of the performance envelope to compensate for the fact the pressure will go up when the system is trickle mode; e.g. night time.

- If most of the dampers on multiple branches are exceeding or close to the maximum pressure then reduce the pressure setting of the fan.
- If only the dampers on a particular branch are close to or exceeding the maximum pressure then reduce the setting of the relevant branch balancing damper.

If some dampers failed to produce the target airflow and the pressure across them are low; i.e. at or below the bottom line of the performance envelope, then increase the pressure setting by about 30-40Pa and repeat the tests.

Damper	Nominal design pressure across damper	Maximum allowable pressure across damper with system at boost
CVD100	60Pa	90Pa
CVD125	70Pa	110Pa
CVD150	80Pa	130Pa
CVD200	90Pa (duty up to 100l/s) 150Pa (for duty from 100l/s to 125l/s)	170Pa

5. Check and adjust the trickle volume flowrate of CVD damper

Remove the boost signal to all the CVD dampers.

Alternatively - Adjust the trickle pot only to the target trickle flowrate using the marking around the pot as a guide. Repeat for all the CVD dampers in the system.

Check that neither switched live signal nor CVD-PIR is active. Wait for the damper to travel to the trickle position. This may take some time if either switched live signal or CVD-PIR had been activated depending on the setting of the run-on timer.

Measure the airflow at the grille using a suitable instrument; e.g. a calibrated hood anemometer. Since the calibration marking on the CVD damper were based on laboratory set up, the actual site conditions may cause these to drift. Therefore it may be necessary to adjust the potentiometer setting up or down slightly to achieve the target flowrate.

Be sure to adjust only the trickle pot.

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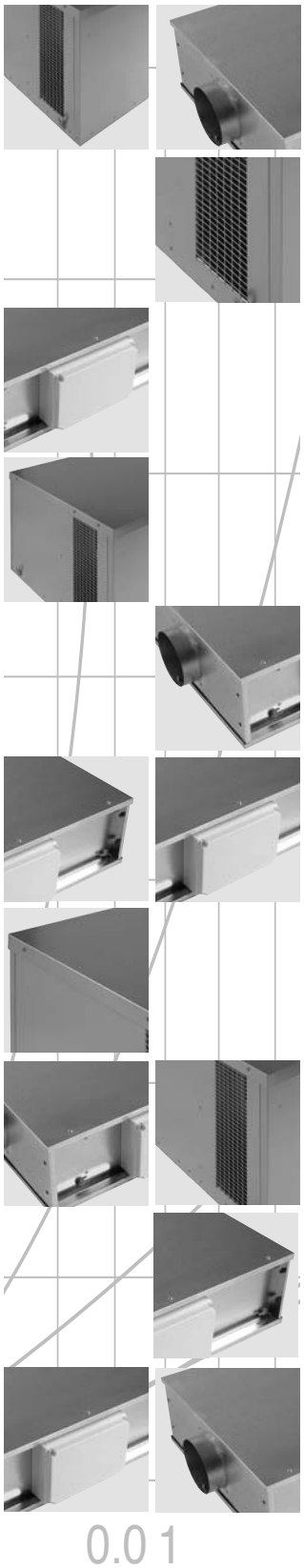

Appendix 1 - Detailed operating sequence of CVD damper

1. On power up. The active LED will flash 3 times; after this the LED will be lit continuously if the switched live signal or the CVD-PIR is active (boost mode) and flash slowly if it is inactive (trickle mode). The damper will drive close for 12 seconds then open for 15 seconds. The damper will then drive close for 90 seconds to ensure it starts its operation from the fully closed position. Some noise may be heard during this period as the damper is driven against its end stop!

   Warning – the unit must be connected permanently to the mains supply during normal operation. Use the switched live (SL) or the CVD-PIR to select boost setting. If the mains switch is switched on and off in normal operation, the noise generated during this start up routine may become a nuisance.

2. The unit will start to measure the airflow after the initial power on routine. If the airflow is below the minimum calibration value (e.g. 5l/s for CVD100), it will drive open until it reaches half way through its allowable travel (approximately 15mm from the foam) and stop.

3. When there is a consistent airflow greater than the minimum calibration (e.g. 5l/s for CVD100) for more than 10 seconds, the unit will begin to operate normally. The damper will be driven open or close depending on the measured airflow and the relevant set point.

4. If the fan is stopped and the damper is less than half opened then the damper will travel to half opened position and stop. If the damper is at position beyond this, it will just stop. This is to make sure the damper is opened when the fan restart. The fan is considered to have restarted the conditions given in point 3 is met.

5. The damper has a limited travel of approximately 35mm. Therefore it is essential that the gap between the foam and damper blade is less than 35mm to obtain full controllability before the damper is switched on. A maximum gap of about 20mm is recommended and would be the normal gap when the damper is delivered. Do not manually move the damper blade beyond its operating range.