INTRODUCTION

The RICKARD PCD may be supplied complete with electronic pressure controls which will enable the damper to maintain a constant branch duct static pressure at all times. The pressure controller may be mounted remote from the PCD in a separate control panel.

In the case of the damper-mounted controller, a 220/24Volt transformer and 2m PVC power lead with plugtop are included and the controller is completely pre-wired in the factory. In the case of the controller which is mounted remotely, the contractor must provide a 24V AC power supply and must also complete the wiring between the controller and the damper actuator.

The static pressure sensor is supplied loose, to be fitted to the branch duct in a suitable position by the contractor. The interconnecting cable between the controller and the sensor form part of the supply and although the standard length supplied is 20m, additional cable may be supplied if required.

INSTALLATION

The PCD may be manufactured to any size required, both in terms of the width and the height of the unit. Although the standard depth is 150 mm, this too may be varied to suit any requirements but may not be less than 150 mm.

When damper widths exceed 1000 mm, the aluminium blades are split and a mullion is fitted down the centre of the casing. In this case two actuators would be fitted, one for each section. As a rule the area of blades on one actuator should never exceed 0.5 m². For example, a damper of say 1400 × 1400 mm would consist of four sections, each 700 × 700 mm and each having its own actuator.

The standard PCD would be manufactured with 35mm sheet metal flanges complete with four fixing holes on each flange or pre-manufactured flanges such as MEZ flanges are available as an optional extra.

The PCD must always be installed with the actuator on the downstream side of the vanes. The PCD may be installed with the Lindrive actuator on the top or bottom depending on the specific installation, but not on the sides (the vanes must always be horizontal).

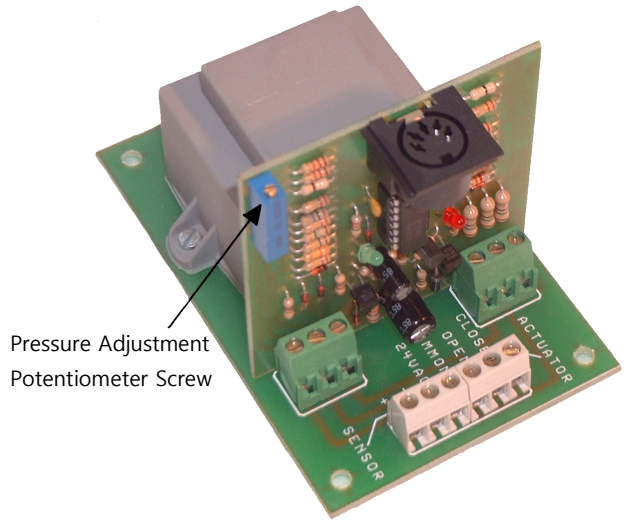
The Pressure Sensor is supplied loose and is easily fitted to the duct on site. Drill a 10mm diameter hole in the duct to accept the sensing probe and fix the sensor by means of two self tapping screws. Ensure that the sensing probe protrudes into the air stream and is not obstructed by internal duct lining or any other such obstruction.

In all cases the pressure sensor for a branch duct should be fitted on the branch duct itself and not in the feeder duct to the individual terminal nor in the terminal unit itself.

Generally it is recommended that the sensor be fitted at a point which is half to two thirds of the distance from the damper to end of the duct run so that the most representative pressure is sensed. Avoid placing the sensor close to bends or other obstructions.

OPERATION

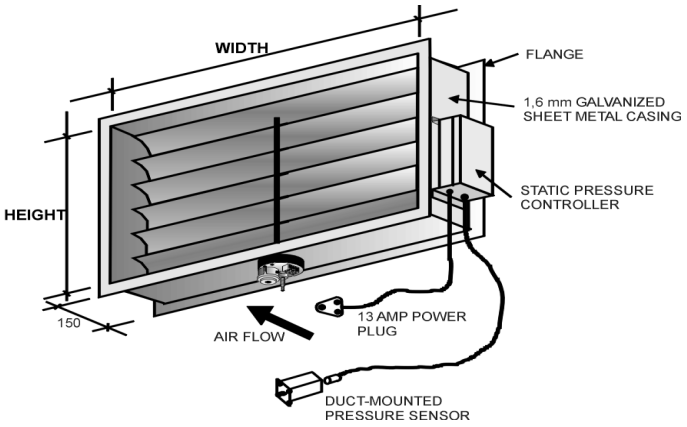
To adjust the duct static pressure, turn the pressure adjustment potentiometer screw. Clockwise rotation of this screw causes the PCD to open and increase the duct static pressure. The flashing green LED indicating light on the controller indicates that the controller is transmitting a signal to drive the damper open. This signal will continue even after the damper has reached the mechanical limit stops, unless the setpoint has been reached. Note that 20 turns of the potentiometer cover the full range of adjustment.



The frequency with which the light flashes is an indication of how close the damper is to the required setpoint. As the duct static pressure approaches setpoint, the flashing slows down and will stop flashing altogether when setpoint is reached. In the same way, the red LED indicating light indicates that the controller is transmitting a signal to close the damper. At setpoint both lights are off. An indicating light which remains on continuously means that the duct pressure is far from setpoint and that the actuator is driving continuously to correct the pressure. The problem in this case may be that the static pressure upstream of the damper is incorrectly set.

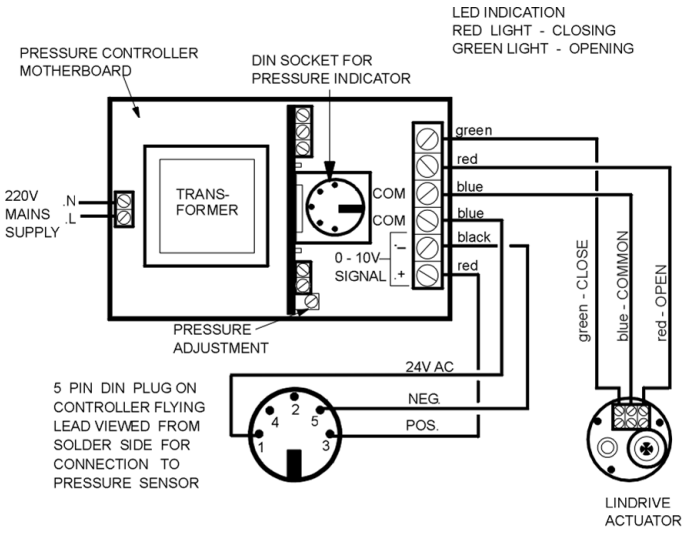
DAMPER MOUNTED CONTROLS

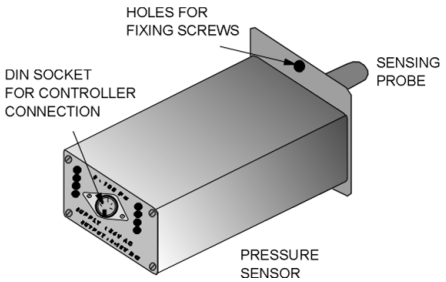
In this case the pressure controller is mounted in a panel which is



attached to the side of the damper.

A 20m length (standard) of sensor cable with DIN type connector fitted to one end, is attached to the controller and must be plugged into the pressure sensor once it has been fitted to the branch duct.



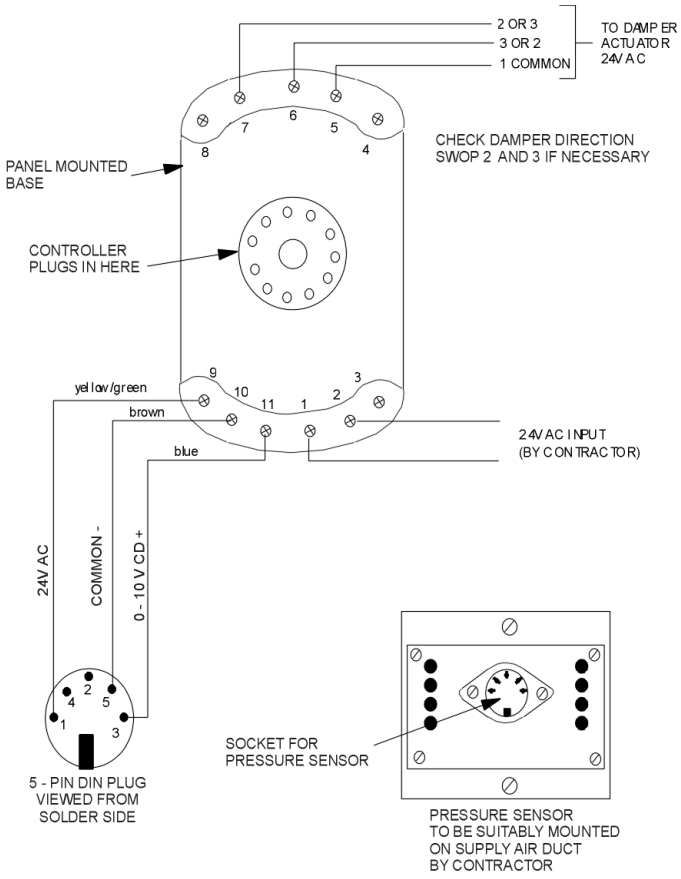


REMOTE MOUNTED CONTROLLER

In some cases the Pressure Control Dampers may be mounted in positions where it is difficult to access the controller for the purpose of adjusting the static pressure setpoint. In this case the controller may be supplied separately, to be mounted in a remote control panel which is more easily accessible.

On the front face of this controller are the two indicating lights which indicate whether the controller is transmitting a signal to drive the damper open (green) or closed (red). The static pressure setpoint adjustment screw is also located here, as well as a DIN socket for the pressure indicating gauge connection, as detailed below.

The controller has a multi-pin plug-in connector and matching base with screw terminals to facilitate field wiring. The pressure sensor and actuator are wired directly to this base and a 24 Volt AC power supply must be connected to the terminals as shown on the following diagram. The control characteristics are exactly the same as for a damper mounted controller.



PRESSURE SENSOR

The RICKARD Static Pressure Sensor operates by measuring the airflow through the sensing probe. This airflow is due only to the static pressure in the duct as the probe must enter the duct at right angles to the air stream, so that the velocity of the air does not influence the reading.

It is therefore most important that the sensing probe is not altered in any way that may influence the air flow through the probe. This would include modifications such as extending the probe with an additional length of tubing or even blocking the ventilation holes at the back of the sensor enclosure.

Pressure sensors are available with the following duct static pressure control ranges:

0 – 100 Pa

0 – 200 Pa

0 – 500 Pa

Note that the same controller is used in all cases; the range is determined by the choice of sensor only.

PRESSURE INDICATION

The RICKARD pressure controller provides a facility for connecting a meter which will give a direct indication of duct static pressure. This eliminates the need for manometers and pitot tubes which are clumsy and require special holes to be drilled into the duct for taking readings. Both locally and remote mounted controllers have a DIN socket to which the Pressure Indicating Meter is connected. It is normal practice to have at least one such portable meter permanently available at each installation.

Especially during commissioning, this meter makes it easy to monitor the duct static pressure as it receives the same signal as that controller receives from the sensor.

Note that the indication is given as a percentage of the full scale reading of that particular sensor – e.g. an indicated 30% for a 0 – 200 Pa sensor is equal to 60 Pa.

FACE AND BYPASS DAMPER CONTROL

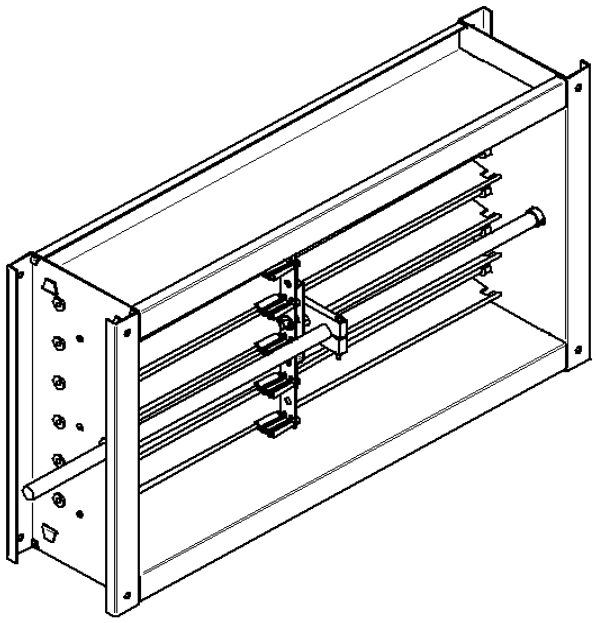
The Rickard static pressure controller may be used to control more than one damper, as in the case of face and bypass dampers. In this case the two actuators are simply wired in the opposite sense so that the one damper drives open while the other drives shut.

The controller is able to drive up to four Lindrive actuators simultaneously.

OTHER ACTUATORS AND CONTROLS

Should there be a need to use controls not supplied by RICKARD, it must be noted that the Lindrive actuator requires a controller with a 3-point floating control output. It cannot accept a 0 – 10 Volt DC control signal.

Should the latter be the case, it may be necessary to fit an actuator which is compatible with the selected controller. This actuator may be of the push-pull type or the type which has a rotary action. These actuators would normally be free-issued to RICKARD for fitting to the damper in our factory.



COMMISSIONING PROCEDURE

The function of the PCD is to maintain a constant pressure in the system regardless of airflow. This constant pressure is necessary to allow the VAV diffusers to work correctly as they are sized and set to deliver design volumes at a specific pressure. Two methods of commissioning are suggested here. The first and easier method assumes that there is a high degree of confidence in the system, while the second offers a more exhaustive and expensive alternative which proves the systems thoroughly.

For either commissioning technique to be useful, it should firstly be established that the thermostat/controllers of the VAV terminals are set to control at a realizable temperature. If the temperature set point requires more of the air conditioning system than the design conditions allow, the system may never perform satisfactorily.

METHOD 1

Select the pressure control damper in the branch duct furthermost from the supply air fan and drive it to its fully open state. Next, establish the system design volume diversification factor and fully open enough of the VAV terminals, in the branch duct under consideration, so that the maximum simultaneous air volume is passing through the PCD. Now select the VAV terminal requiring the highest pressure to satisfy its design volume, carefully measure the diffuser neck total pressure (or duct static in the case of WBD units) and adjust the main/riser duct static pressure controller to achieve the desired pressure at the terminal being considered. Finally, without changing any of the criteria in the branch duct, adjust the branch duct static pressure controller so that pressure in that branch will be controlled at the level which has been set through the adjustment of the main riser controller.

To set the remaining branch duct static pressures, in each case select the VAV terminal requiring the highest pressure to satisfy its maximum design supply air volume, drive to the fully open state, carefully measure the spigot total pressure (or duct static pressure in the case of WBD terminals) and adjust the static pressure controller accordingly.

The system is now fully operational.

METHOD 2

For each pressure control damper and associated branch duct, select the diffuser which needs the highest spigot total pressure to enable it to supply maximum design air volume and drive this diffuser to fully open. Also drive all pressure control dampers to fully open. Next, drive the other diffusers until design maximum air is leaving the Air Handling Unit and is being distributed uniformly throughout the conditioned space. At this stage diffuser spigot total pressures at fully open diffusers will be on or slightly above their respective maximum air requirements. Adjust the duct static pressure controllers until the diffusers which need the highest spigot total pressures have sufficient pressure available. At this stage the system is fully commissioned, but it may be tested by monitoring duct pressures while changing the air flows around the system. For a system operating satisfactorily one would expect duct pressures to vary by 7 - 10% as air flows vary from 30% to 100%.

Please note that these commissioning recommendations do not check a system for all faults. They are intended only to set up and test the pressure controls and, to a lesser extent, the diffusers. Gross system faults, such as disconnected or ruptured flexible ducting, will not be traced using these methods.

MAINTENANCE

The Rickard PCD dampers require no routine preventative maintenance. No adjustment should be required once the system is commissioned.

Although the Rickard Lindrive actuator has a 3 year warranty, the replacement procedure for an installed damper actuator is discussed should it become necessary.

It is very important to note that no attempt should be made to loosen the motor spindle or shaft from its internal mountings. The only way to fasten it again will be by removing the damper completely. Never attempt to turn the spindle as this will damage the motor gears as well as dislocate the spindle from the internal mounting.

ACTUATOR REPLACEMENT PROCEDURE

1. Measure and record the exact position of the top lock nuts on the spindle. These are the minimum airflow position nuts and should not be adjusted.
2. Unlock the two brass lock nuts on the spindle/shaft using two 13mm spanners. Do not turn the spindle.
3. Disconnect the three wires, but remember to make a note of the wire positions. Refer to section 4 for the wiring diagram.
4. Loosen and remove the three fixing screws from the casing.
5. Remove the actuator by rotating it anti-clockwise on the spindle.
6. Fit the new actuator by screwing it onto the spindle.
7. Line up the fixing holes with the self-clinching nuts on the casing and fasten the screws.
8. Connect the wires in there respective positions as before.
9. Place the top lock nuts in position as measured and lock them together without turning the spindle.

WARRANTY

RICKARD AIR DIFFUSION (Pty) Ltd (RICKARD) warrants that its Dampers, inclusive of any Rickard options and accessories (whether factory or field installed) shall be free from defects in material or workmanship for a period of two year from the date of shipment and agrees to repair or replace, at its option, any parts that fail during said two year period due to any such defects which would not have occurred had reasonable care been taken, provided that such parts have been inspected by RICKARD and found defective and provided the components have been given normal and proper usage and all parts and controls remain unaltered.

RICKARD makes no warranty of merchantability of products or of their fitness for purpose or any other express or implied warranty which extends beyond the limited warranty above. RICKARD'S liability for any or all losses and damages resulting from defects shall in no event exceed the cost of repair or replacement of parts found defective upon examination by RICKARD. In no event shall RICKARD be liable for incidental indirect or consequential damages or damages for injury to persons or property. RICKARD shall not be responsible for freight to or from its plant in connection with the inspection, repair or replacement of parts under the terms of this limited warranty, nor for the cost of removal or installation.