

REDLAW

CLM-E TERMINAL UNITS

INSTALLATION
OPERATION & MAINTENANCE
INSTRUCTIONS

**energy conscious
air conditioning systems**

Contents

Introduction	1
Dimensions and Physical Data	2
Installation Guide	3
Fixing Diffuser	4
Static Pressure Control Assembly	5
Typical PRD-E/CLM-E Arrangement	6
Typical Wiring Diagram CLM-E-W Terminal	7
Typical Wiring Diagram PRD-E Damper	8
Typical Wiring Diagram CLM-E-H Terminal	9
Typical Wiring Diagram CLM-E Cooling only Terminal	10
Commissioning	11-13
Maintenance	14

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Ref: CLM-EIOM.CON

CLM-E, PRD-E INSTALLATION

Introduction

This booklet has been produced as a guide for the installation, commissioning and maintenance of REDLAW equipment. We strongly recommend that this booklet is read thoroughly before planning your installation and commissioning programme. If, after reading this booklet you require any further information please do not hesitate to contact our Edenbridge office, where we will be pleased to answer your enquiries.

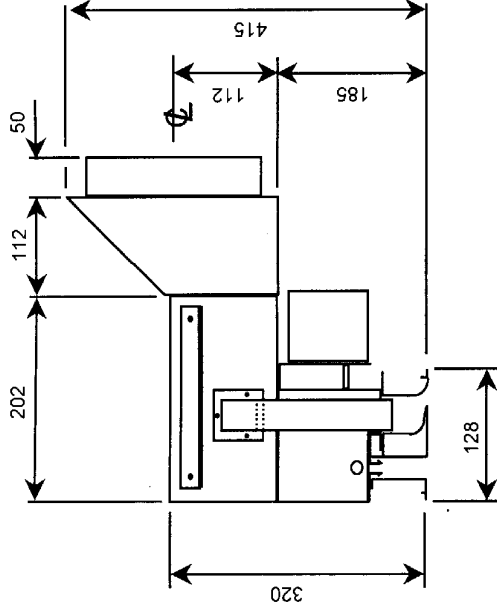
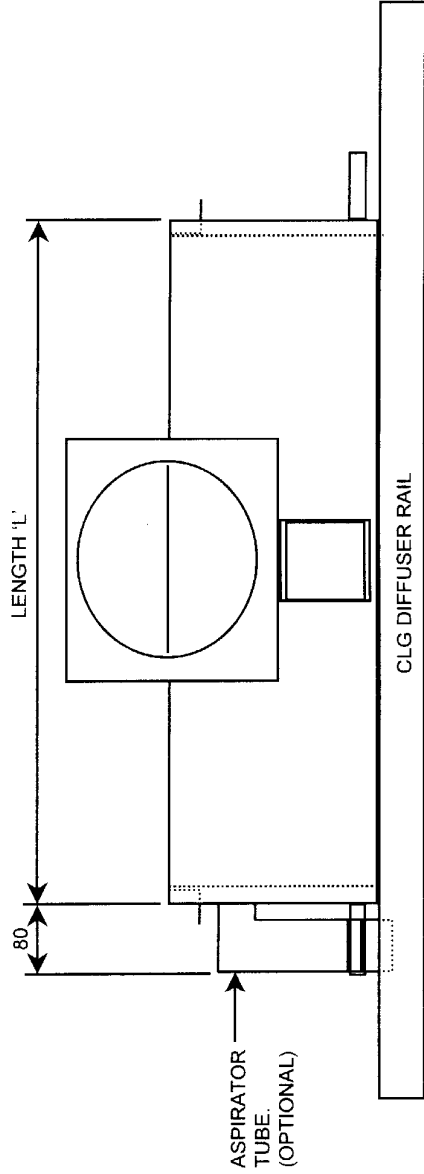
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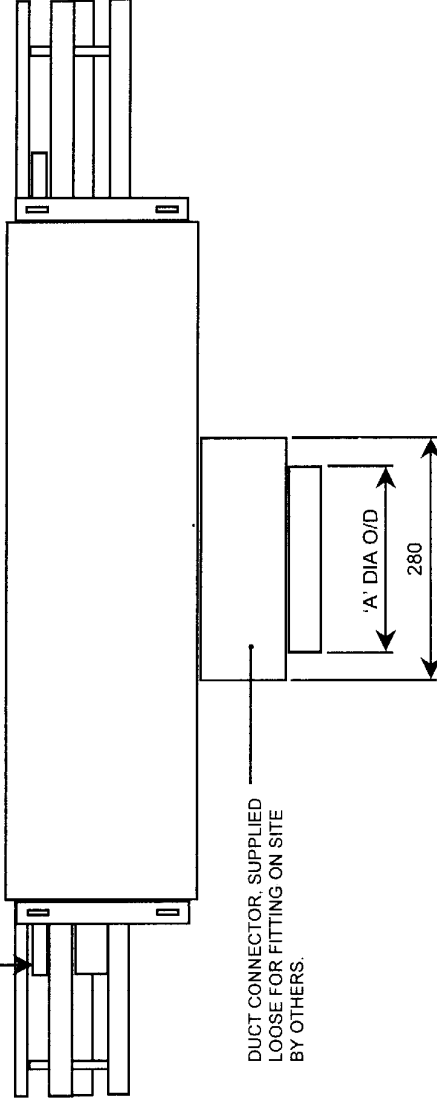
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15mm O/D PLAIN COIL CONNECTIONS.



NOTES:

1. DIFFUSER RAIL CAN BE SUPPLIED IN LENGTHS UP TO 3.60 METRES FOR INSTALLING IN CONTINUOUS RUNS OR IN INDIVIDUAL LENGTHS.
2. THE HEATING ACTUATOR IS MOUNTED INSIDE THE UNIT.
3. ALL DIMENSIONS ARE IN MILLIMETRES.
4. DO NOT SCALE.

SIZE	600	900	1200
L mm	584	889	1194
A mm	148	198	198

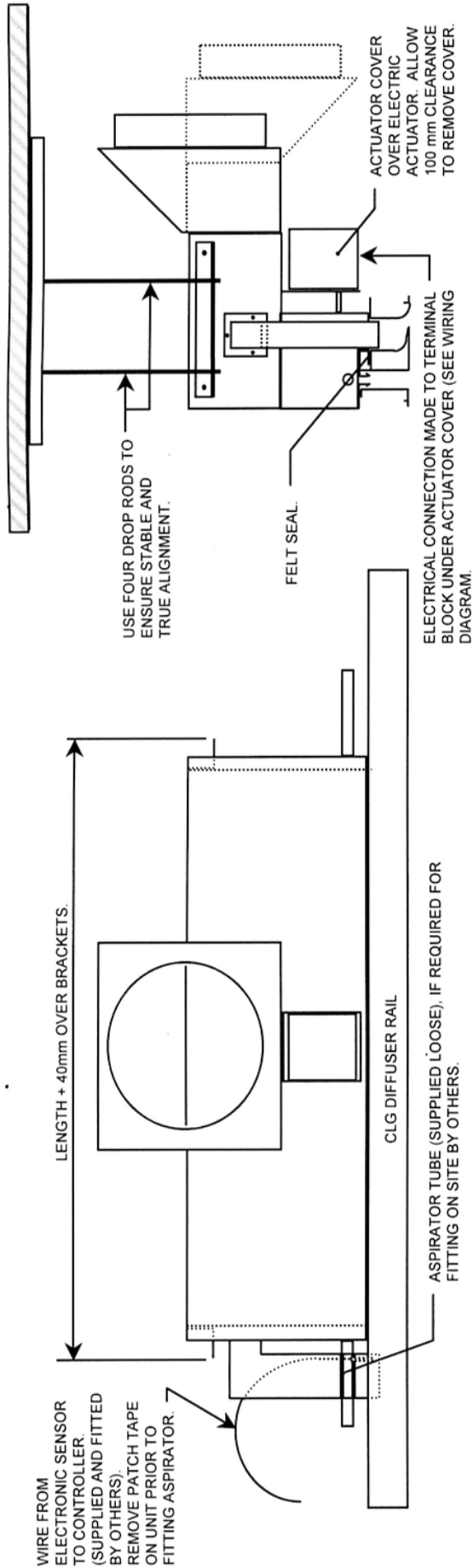
CLM-E DIMENSIONS AND PHYSICAL DATA

TO BE READ IN CONJUNCTION WITH "INSTALLATION GUIDE" ON PAGE 3.

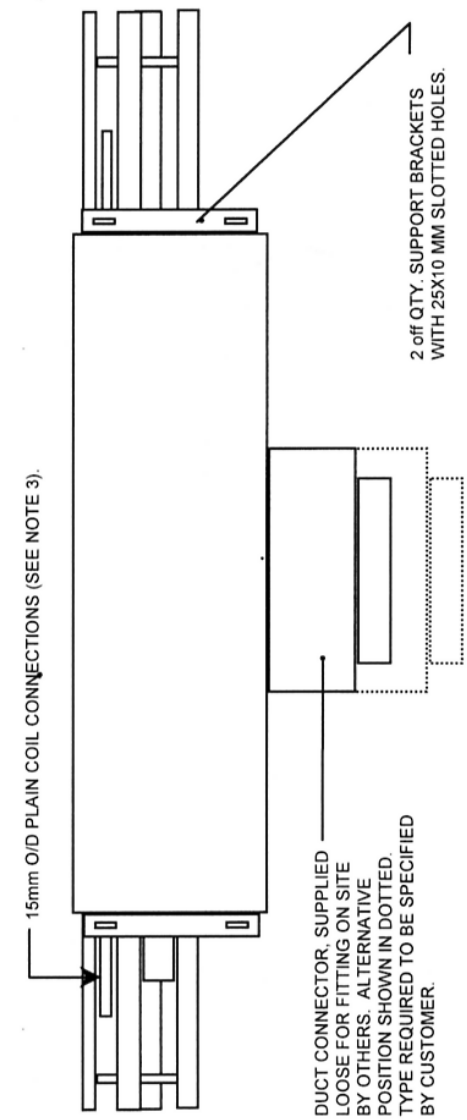
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Page 2.



15mm O/D PLAIN COIL CONNECTIONS (SEE NOTE 3).



NOTES.

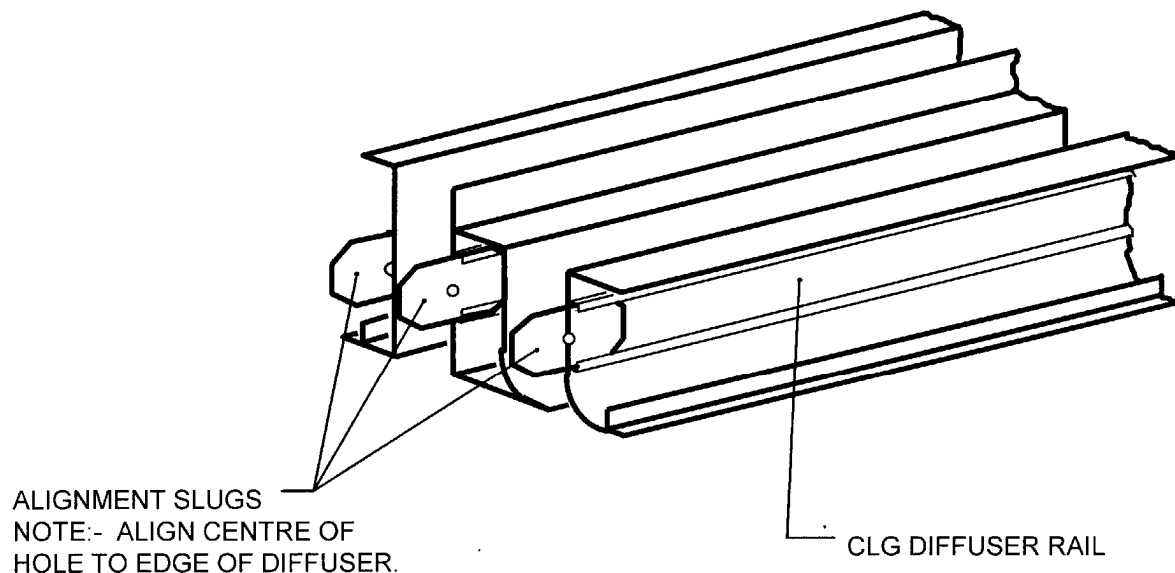
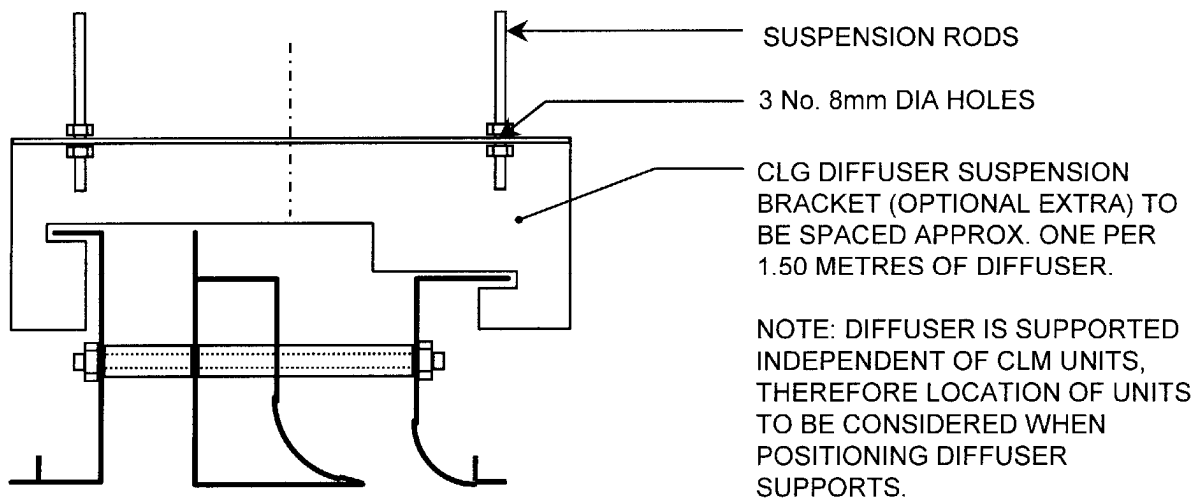
1. STANDARD POSITION OF ASPIRATOR TUBE AS SHOWN I.E. LHS WHEN FACING DUCT CONNECTION.
2. ROOM AIR IS INDUCED OVER THE SENSOR THROUGH THE ASPIRATOR TUBE. ASPIRATOR TUBE CAN BE SUPPLIED AS AN OPTIONAL EXTRA
3. CLM-E UNIT TO BE INSTALLED INITIALLY APPROX. 50mm ABOVE CLG RAIL POSITION. UNIT TO BE LOWERED ON RAIL AFTER IT HAS BEEN HUNG AND CORRECTLY ALIGNED. FLEXIBLE PIPE CONNECTION (BY OTHERS) ARE RECOMMENDED.
4. WHEN INSTALLING PLEASE ENSURE CLM-E TERMINAL IS LOCATED CORRECTLY BOTH HORIZONTALLY AND VERTICALLY TO THE CLG DIFFUSER RAIL.
5. ENSURE THAT CLM-E TERMINALS ARE LOWERED SUFFICIENTLY ONTO THE CLG RAIL SUCH THAT THE FELT SEAL TOUCHES THE TOP OF THE RAIL WITHOUT THE WEIGHT OF THE CLM-E BEING TAKEN BY THE RAIL.
6. THE CLG RAIL IS SUPPORTED INDEPENDENTLY OF THE CLM-E TERMINAL (BY OTHERS). STANDARD SUPPORT BRACKETS ARE AVAILABLE AS AN OPTIONAL EXTRA, IF REQUIRED.

INSTALLATION GUIDE FOR CLM-E UNITS.

SEE PAGE 2 FOR PHYSICAL DETAILS.

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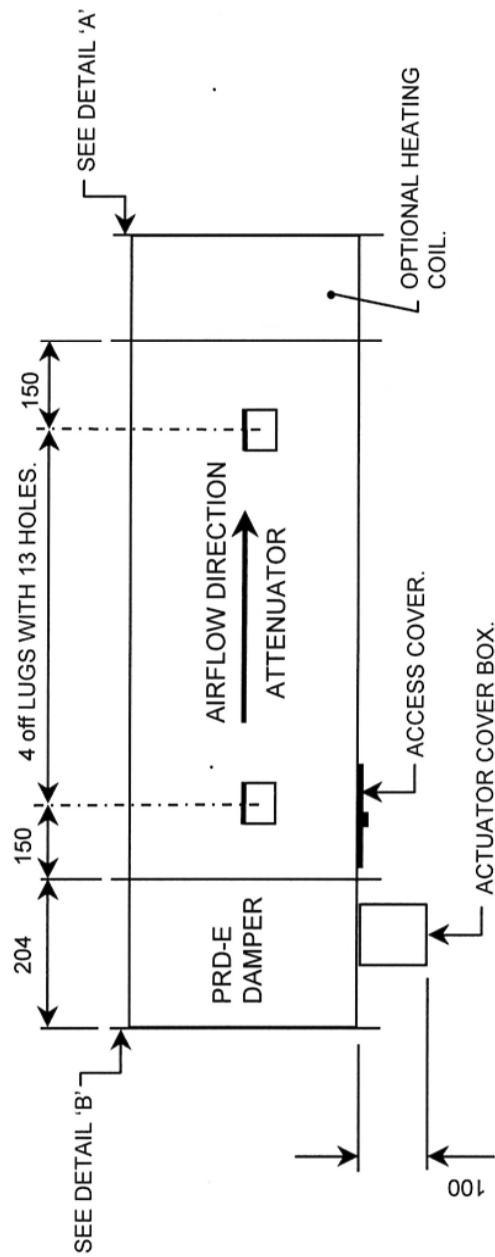
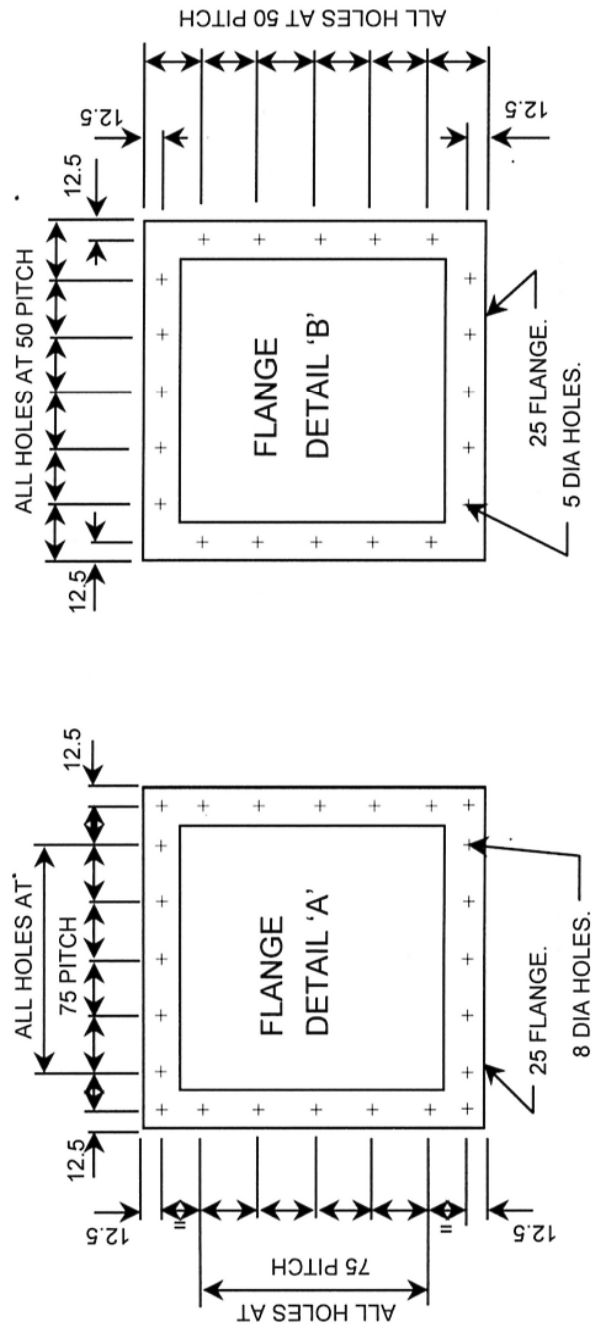
ENSURE DIFFUSER RAIL IS ALIGNED HORIZONTALLY AND LEVEL SUCH THAT THE TOP OF THE RAIL REMAINS HORIZONTAL ALONG ITS ENTIRE LENGTH WITHOUT ANY TWISTING AND PERPENDICULAR TO THE CLM UNITS.

TYPICAL DETAILS FOR FIXING CLG DIFFUSER

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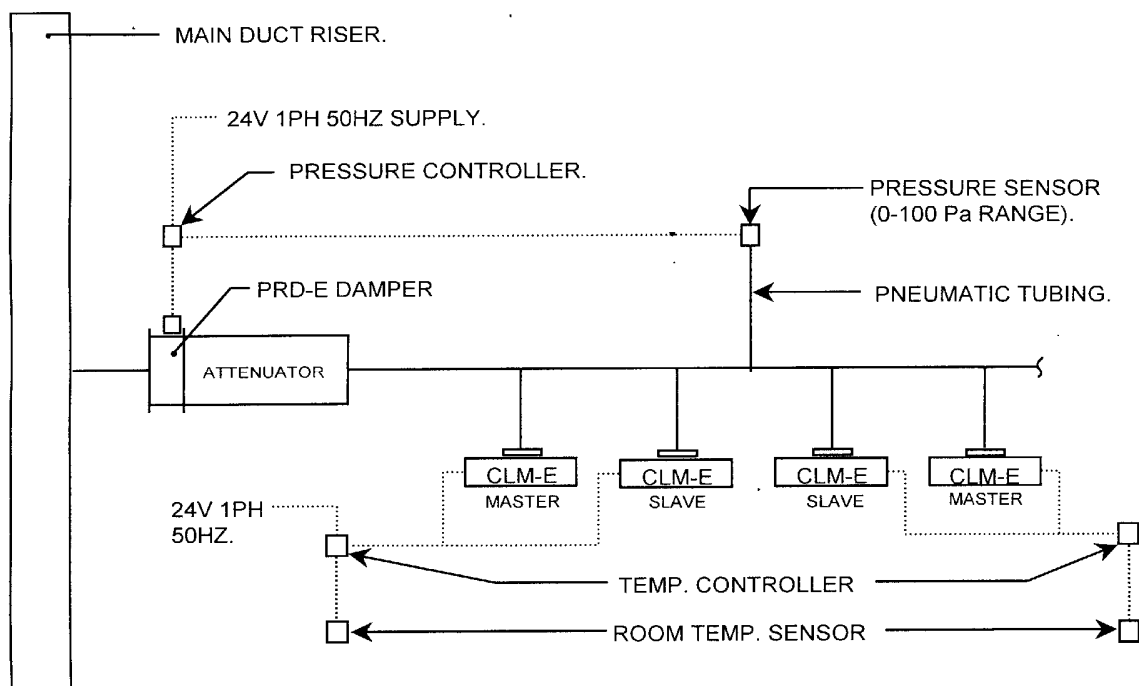
NOTES.

1. ENSURE ACCESS AND ACTUATOR COVER BOX ARE NOT OBSTRUCTED.
2. ENSURE ASSEMBLY IS HUNG WITH AIRFLOW DIRECTION AS INDICATED.
3. ALL DIMENSIONS ARE IN MILLIMETRES.

PRD-E STATIC PRESSURE CONTROL ASSEMBLY

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NOTES:

1. DOTTED LINES REPRESENTS INTERCONNECTING CONTROL WIRING (BY OTHERS).
2. NUMBER OF SLAVE TERMINALS POSSIBLE IS DETERMINED BY CONTROLLER CAPACITY.
3. CLM-E TERMINALS AND PRD-E DAMPERS ARE SUPPLIED WITH FITTED ELECTRIC ACTUATORS (STAEFA A1L150 OR EQUAL) AND REQUIRE A 24V A/C CONTROL SIGNAL. ALL OTHER CONTROLS TO BE SUPPLIED AND FITTED BY OTHERS.
4. POWER CONSUMPTION OF EQUIPMENT:-
 - a. PRD-E DAMPERS - 1.50 VA EACH.
 - b. CLM-E TERMINALS - 3.00 VA EACH.

THE POWER SUPPLY TO THE CONTROLLERS SHOULD BE ISOLATED DURING NON OPERATIONAL PERIODS TO EXTEND ACTUATOR LIFE.

5. CONTROL OPERATION

- a. PRESSURE SENSOR + CONTROLLER IS USED TO MAINTAIN A CONSTANT STATIC PRESSURE IN BRANCH DUCT INDEPENDENT OF VOLUME FLOW (SENSOR RANGE 0-100Pa).
- b. TEMPERATURE SENSOR AND CONTROLLER ADJUSTS THE CLM-E-W1 COOLING DAMPER POSITION TO ALLOW JUST SUFFICIENT AIR INTO THE SPACE TO MAINTAIN ROOM TEMPERATURE. INTERNAL CONTROLS FITTED AS STANDARD TO EACH CLM-E-W1 PROVIDES HEATING (AT MIN. VOLUME) WHEN REQUIRED. MINIMUM COOLING/HEATING VOLUME IS APPROX.. 33% OF RATED VOLUME.

**TYPICAL CONTROL ARRANGEMENT FOR ELECTRONIC CONTROL-
PLANE TERMINALS AND PRD-E PRESSURE CONTROL DAMPERS.**

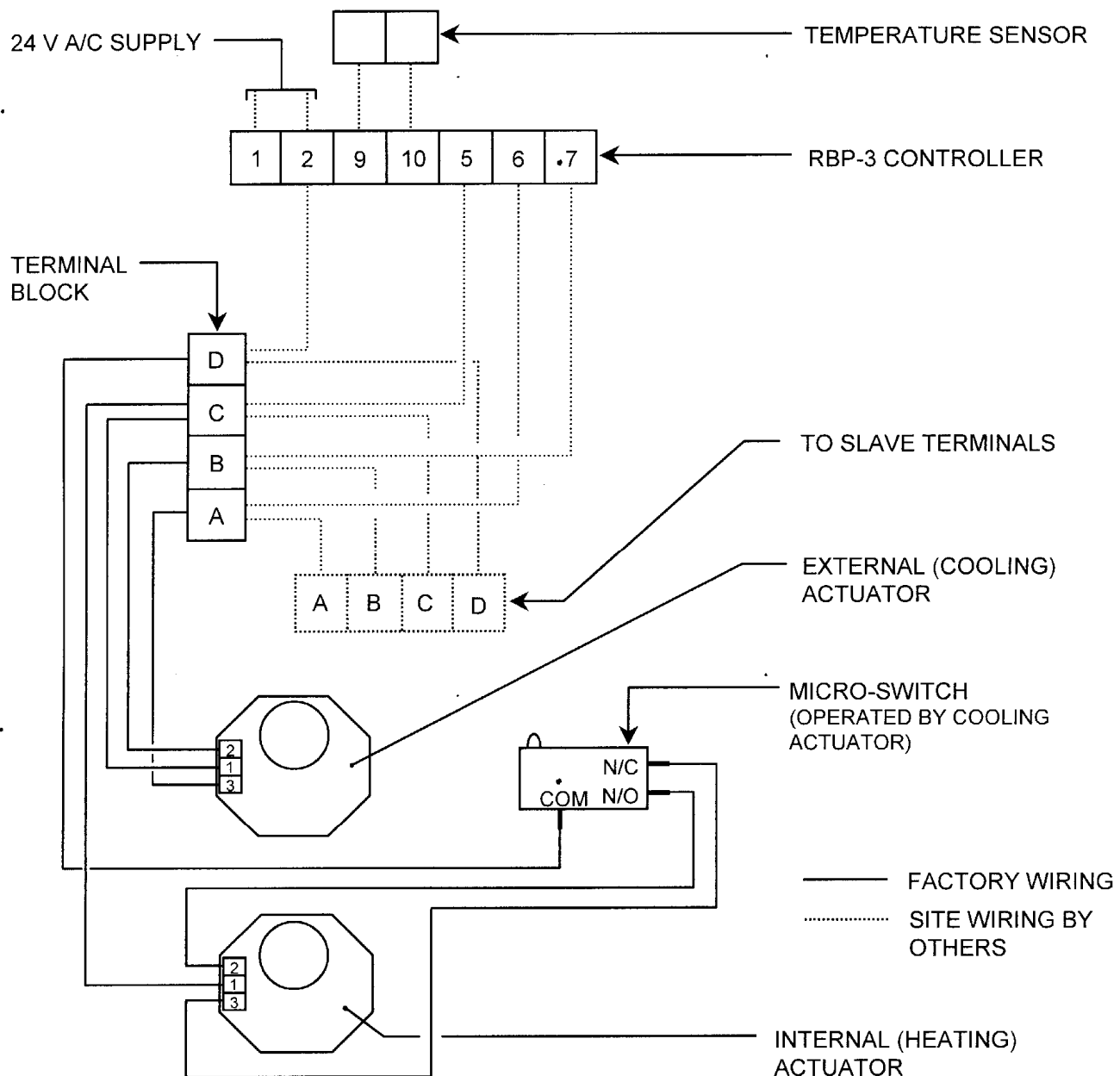
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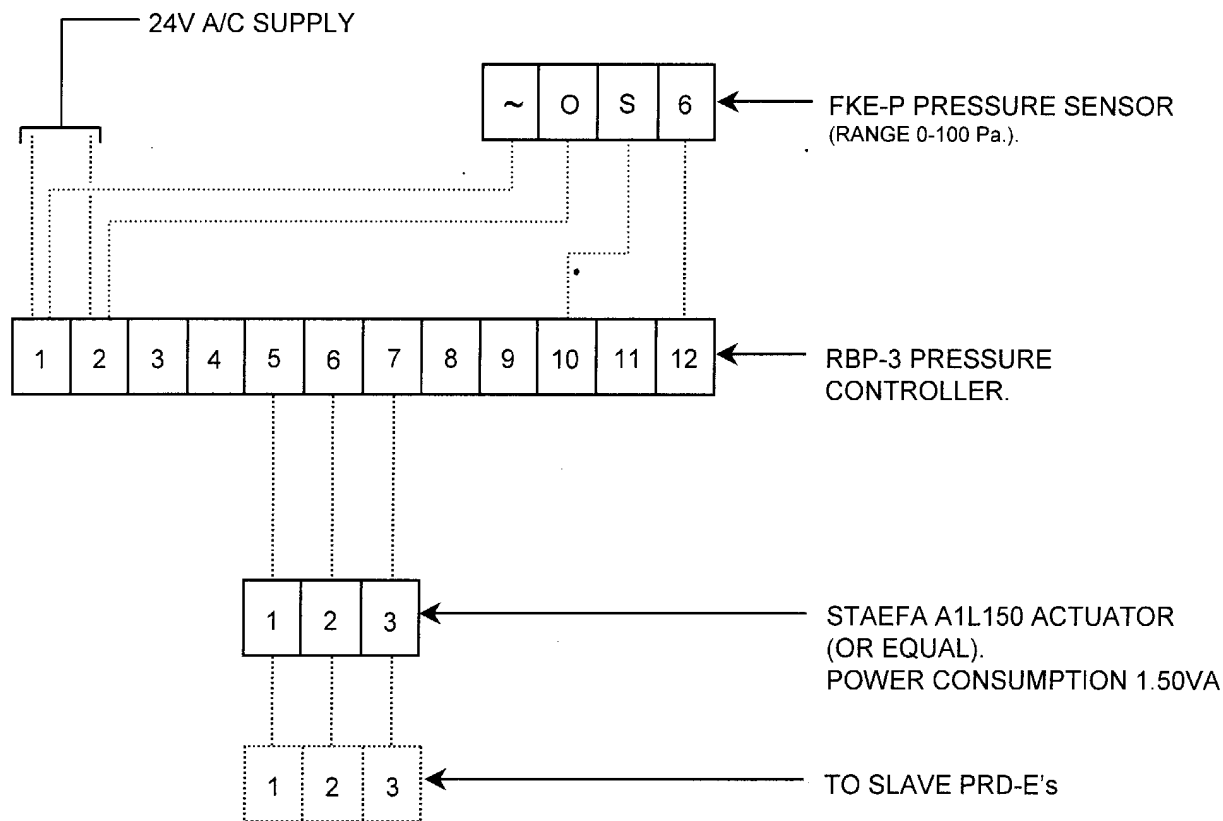
1. MAXIMUM No. OF "SLAVE" CLM TERMINALS DETERMINED BY CONTROLLER POWER HANDLING CAPACITY.
2. TEMPERATURE SENSOR AND CONTROLLER ETC. SUPPLIED AND FITTED BY OTHERS.
3. THE POWER SUPPLY TO THE CONTROLLERS SHOULD BE ISOLATED DURING NON-OPERATIONAL PERIODS TO EXTEND ACTUATOR LIFE.
4. ABOVE BASED ON THE USE OF STAEFA CONTROLS. DIAGRAM TO BE MODIFIED TO SUIT OTHER COMPATIBLE CONTROLS.

TYPICAL WIRING DIAGRAM FOR CLM-E-W1 TERMINALS

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24V A/C ACROSS TERMINALS :-
 1 & 2 - CLOSSES DAMPER
 1 & 3 - OPENS DAMPER

NOTES.

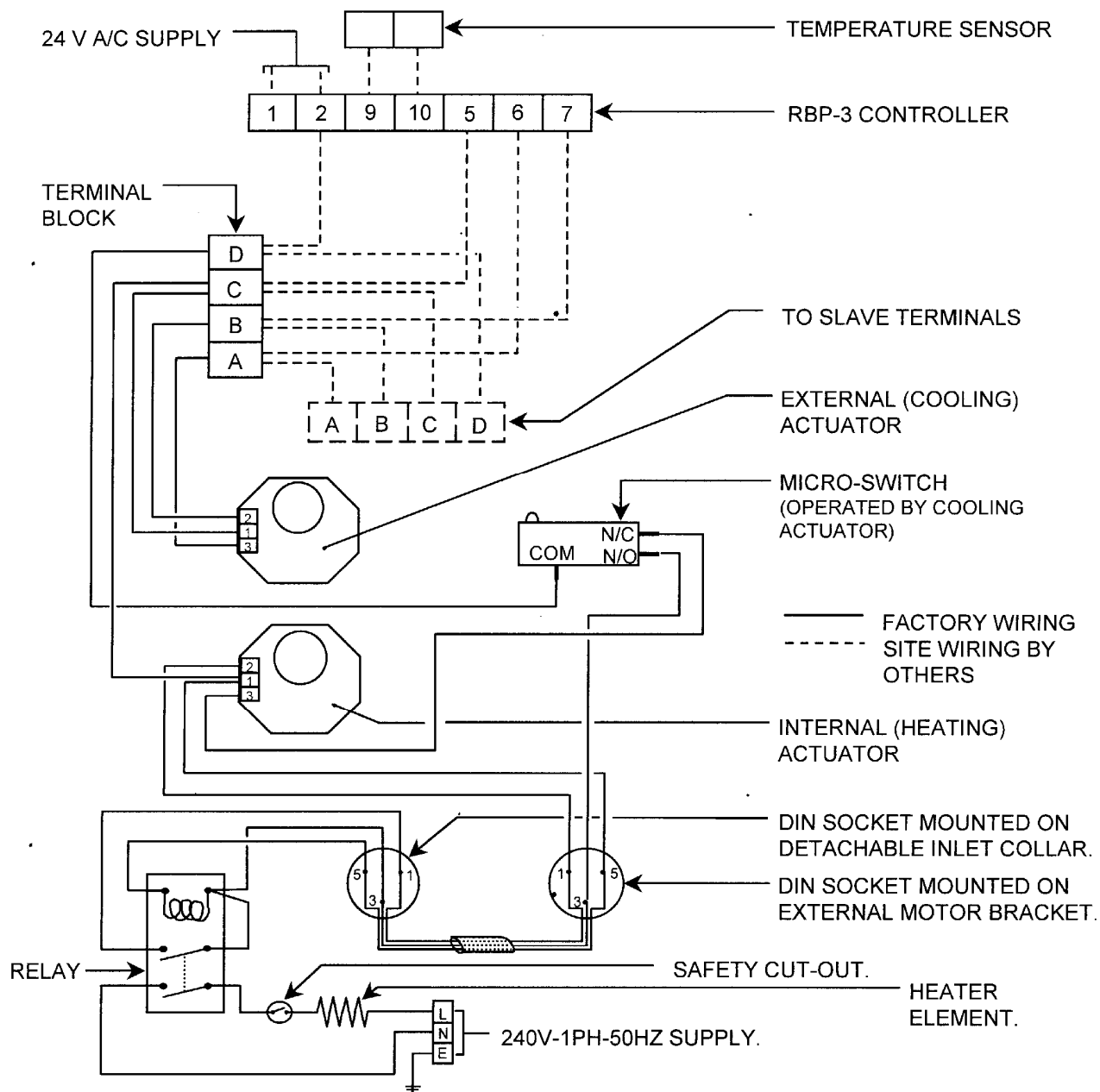
1. NUMBER OF "SLAVE" PRD-E's DETERMINED BY SYSTEM DESIGN AND CONTROLLER CAPACITY.
2. PRESSURE SENSOR AND CONTROLLER SUPPLIED AND FITTED BY OTHERS.
3. DOTTED LINES REPRESENTS SITE WIRING BY OTHERS.
4. SELECT SUITABLE SENSOR RANGE FOR APPLICATION (TYPICALLY 0-100 Pa.).
5. REVERSING TERMINALS 6 AND 7 ON CONTROLLER REVERSES DIRECTION OF OPERATION OF DAMPER.
6. ABOVE BASED ON STAefa CONTROLS. DIAGRAM TO BE ADAPTED IF OTHER COMPATIBLE CONTROLS ARE USED.
7. THE POWER SUPPLY TO THE CONTROLLER SHOULD BE ISOLATED DURING NON-OPERATIONAL PERIODS TO EXTEND ACTUATOR LIFE.

WIRING DIAGRAM FOR PRD-E PRESSURE CONTROL DAMPER

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NOTES.

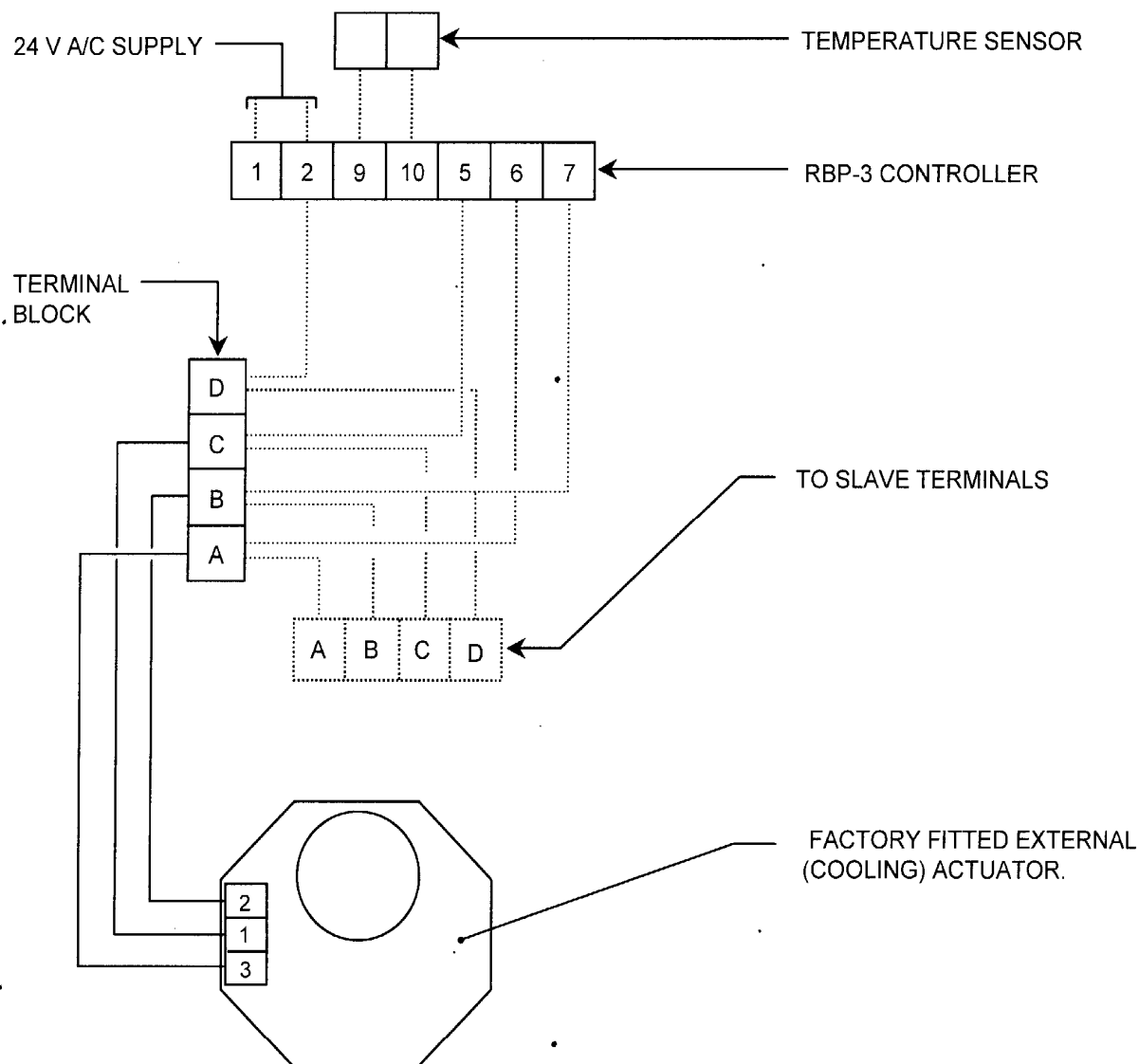
1. NUMBER OF SLAVE TERMINALS DETERMINED BY CONTROLLER CAPACITY.
2. SUPPLY TO HEATER ELEMENT VIA LOAD CONTACTOR AND LOW PRESSURE SWITCH, SUPPLIED AND FITTED BY OTHERS.
3. ABOVE BASED ON THE USE OF STAEFA CONTROLS. DIAGRAM TO BE MODIFIED ACCORDINGLY TO SUIT OTHER COMPATIBLE CONTROLS.
4. THE POWER SUPPLY TO THE CONTROLS SHOULD BE ISOLATED DURING NON OPERATIONAL PERIODS TO EXTEND ACTUATOR LIFE.

TYPICAL WIRING DIAGRAM FOR CLM-E-H TERMINALS.

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NOTE:

1. NUMBER OF SLAVE TERMINALS DETERMINED BY CONTROLLER POWER HANDLING CAPACITY.
2. TEMPERATURE SENSOR AND CONTROLLER SUPPLIED, FITTED AND COMMISSIONED BY OTHERS.
3. DOTTED LINES REPRESENT SITE WIRING (BY OTHERS). SOLID LINES ARE FACTORY WIRING.
4. IF CONTROLLER IS SERVING ONLY COOLING ONLY CLM-E TERMINALS THEN LINK FROM TERMINAL "2" ON RBP-3 TO "D" ON CLM-E IS NOT REQUIRED.
5. POWER CONSUMPTION = 1.50 VA.
6. THE POWER SUPPLY SHOULD BE ISOLATED DURING NON OPERATIONAL PERIODS TO EXTEND THE ACTUATOR LIFE.

TYPICAL WIRING DIAGRAM FOR CLM-E COOLING ONLY TERMINAL.

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COMMISSIONING

General Description of System

The CLM-E unit is used in perimeter zones in a cooling or heating mode. The unit is designed to discharge cooling air horizontally along the ceiling and heating air vertically down the adjacent wall or window. The CLM-E-W unit has an integral one or two row hot water coil with constant hot water supply. The CLM-E-H unit has an integral electric heater. In either case please check our product catalogue to obtain maximum off coil temperatures and maximum kW. ratings of heaters.

System Operation

The CLM-E unit usually operates in conjunction with a static pressure control station (S.P.C.S.), The S.P.C.S. maintains a constant pressure to the CLM-E units. A diffuser or room mounted thermostat controls the air supply from the CLM-E unit via its integral dampers.

The CLM-E unit will operate within a pressure range of 40 (minimum) - 100 pa. A thermostat will control the air from 100% to 33% of the unit rated volume (please note the minimum volume is based on rated volumes and not design volumes). Because the terminals are pressure dependant the duct static pressures quoted in the catalogues and schedules are to be used as a guide only. The resistance of the duct connections etc., will determine the actual static pressure required.

The S.P.C.S. will operate with an upstream pressure range between 180 Pa and 1600 Pa with a maximum pressure differential across the unit of 1500 Pa.

It should be remembered, due to linking several terminals to one S.P.C.S. and therefore one static pressure setting, that some terminals may supply more than the desired design condition when set to maximum. However, when under control the thermostat will reduce the supply volume to offset the actual heat gain. During commissioning, the artificial higher volume must be taken into consideration (please refer to the BISRIA commissioning guide).

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COMMISSIONING PROCEDURE

The following procedure should be considered as the minimum commissioning requirement and it assumes that items (a) to (e) have already been attended to:

- a. The main plant has been checked and commissioned and duct leakage eliminated.
- b. Each unit has been checked for size and type before installation.
- c. Controls have been commissioned and tubing checked for continuity.
- d. The alignment of the units on the rails has been checked (see pages 3 and 4).

Note: Misalignment may result in dumping and noise when in maximum cooling.

- e. The static pressure sensors are correctly positioned and set (see page 5).

Step 1.

Open all diffuser outlets to full cooling position (i.e. maximum airflow condition) by means of adjustment of thermostat/controller set points. If the building temperature is below the minimum set point it will be necessary to heat the building to above the minimum set point, prior to commissioning.

Step 2.

Set main plant static pressure to maximum.

Set the main supply fan controls to maximum volume. If diversification has been allowed such that the fan is not capable of supplying the system at 100% load, then it will be necessary to isolate part of the system equal to the diversity allowed. Or set a proportion of the units to minimum so that the total demand does not exceed the supply fan capabilities (remember to account for the artificial maximums, see last paragraph of the system operation section).

Once this has been achieved check the fan amps and the main duct volume.

The volume delivered should be equal to or greater than the maximum design volume.

Check operation of extract fans where applicable.

Step 3.

Provided an accurate measurement of duct volume can be obtained (using BSRIA recommended procedures), and all CLM-E units supplied by each S.P.C.S. have the same output, equally balanced, then the following simplified procedure may be used:-

Check the air volume through, the S.P.C.S.. If the volume is above or below the desired duty, adjust the static pressure regulator up or down accordingly.

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The following formula may be used to assess the required pressure.

$$\text{New S.P.} = \text{original pressure} \times \left(\frac{\text{design volume}}{\text{actual duct reading}} \right)^2$$

Please note that under no circumstances should a duct static pressure lower than 40 Pa be used in association with the CLM terminal. Higher minimum operating static pressures may be specified in certain arrangements to ensure satisfactory operation of the CLM terminal.

Should the new S.P. obtained from the calculation be greater then +/- 10% from the figure in the catalogue for a given rated volume, then please refer to Redlaw engineering department for advice.

Step 4.

When all the S.P.C.S. have been set up correctly, the main supply duct pressure regulator can be adjusted in a similar manner to the S.P.C.S. regulators (i.e. the duct volume be measured) then the control pressure be adjusted to suit the maximum design condition taking the calculated diversity into account (using the above formula).

Step 5.

Check the pressure at the index run terminal to ensure the system resistance will be overcome throughout the system. Adjust as necessary (ensure that the system is running at maximum design volume, allowing for diversity to ensure a true reading).

Step 6.

With all the units set at maximum demand on a floor by floor basis, set the return air dampers to the appropriate position dependant on the percentage of return air required (where applicable).

Step 7.

Reset the controllers/thermostats to their correct operating conditions.

Step 8.

Where applicable check the air temperature after the S.P.C.S: heaters at maximum and/or minimum flow conditions as appropriate.

PLEASE NOTE THE ABOVE ARE A GUIDE FOR THE MINIMUM COMMISSIONING REQUIREMENT. REFERENCE SHOULD BE MADE TO THE PARTICULAR BUILDING COMMISSIONING SPECIFICATION TO DETERMINE THE ACTUAL REQUIREMENT.

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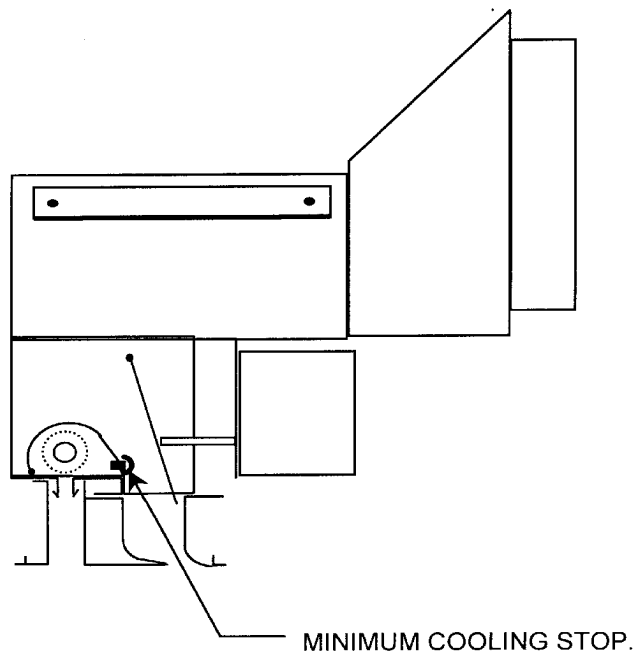
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MAINTENANCE

The Redlaw CLM-E and PRD-E units require no maintenance, apart from on the CLM-E terminal which requires periodic greasing of the minimum cooling stop where it is in contact with the cooling damper blade. A slight metallic noise will be heard if the contact point is in need of lubrication. The stop can be reached from below through the cooling slot and should be lubricated with Shell silicone grease or equivalent.



It is advisable to check the main air supply filters to ensure a build up of dirt and dust does not foul the system.

A yearly visual check of the CLM-E terminal units should be made to ensure the unit control vanes are functioning correctly. Similarly the PRD-E dampers can be inspected via the access cover on the underside of the S.P.C.S's.

Should you require any further information then please do not hesitate to contact our Bath office.

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PAGE 11