

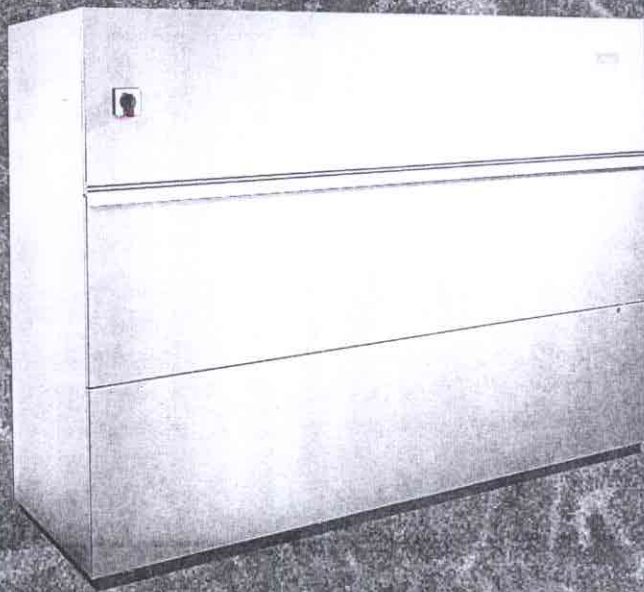


System 4

20-100kW

Sensible Cooler System

TECHNICAL DATA MANUAL



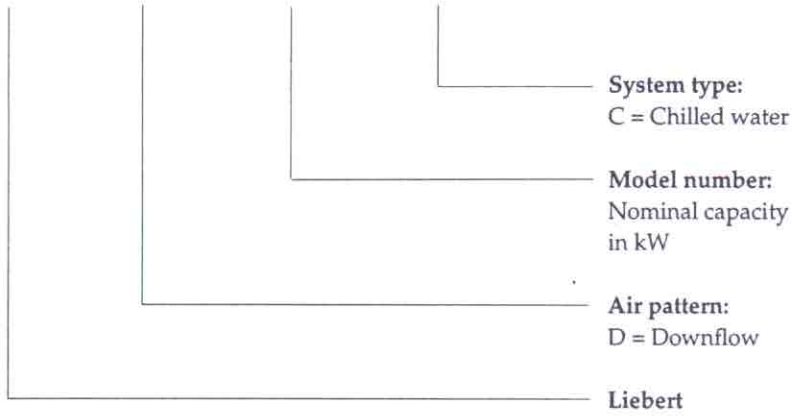
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Introduction

System nomenclature

L D 031 C



In total 7 models of the System 4 Sensible Cooler exist:

LD031C	LD041C	LD061C
LD071C	LD081C	LD091C
LD101C		

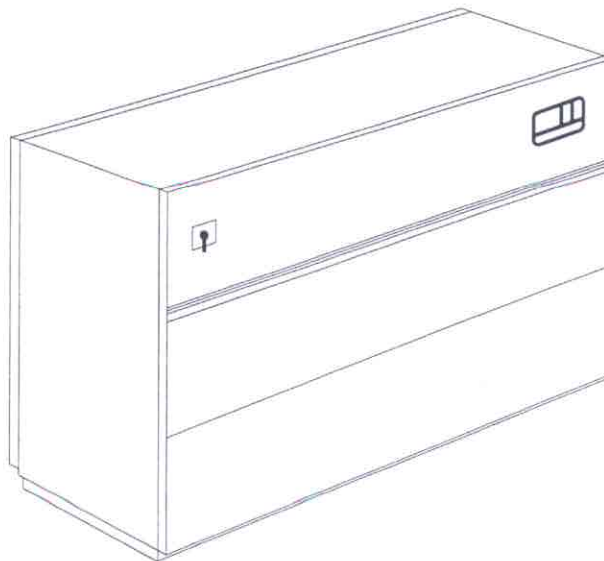


Figure 1 - The System 4 Sensible Cooler

Technical description

Standard equipment

Cabinet

The steel panels with 0.68kg/m³ density insulation protect the system and reduce noise emission. Captive, 1/4 turn fasteners allow controlled front access for routine service and are positioned to enhance cabinet appearance. The top hinged accent panel and lower panels can be opened for service or system monitoring.

The front hinged accent panel is fitted with gas struts to ease servicing access and to prevent strain on the panel during opening and closing. All other front panels are of the lift-off type. This arrangement reduces the access area normally required by a hinged panel.

The unit panels are fitted with seals to prevent air loss and to keep noise levels to an absolute minimum.

Locking disconnect switch

A manual moulded case circuit breaker is mounted in the high voltage section of the electric panel. Access to high voltage components is prevented by the locking mechanism unless the switch is in the OFF position. The switch is externally operated and is field convertible to non-locking by use of a special tool.

Fan section

The Sensible Cooler features a quiet, direct drive fixed speed fan assembly with double inlet centrifugal blower, and lifetime lubrication. The exclusive draw-through design of the fan section provides even air distribution across the evaporator coil, elimination of air bypass around the filters and low internal cabinet pressure drop.

Model LD101C

The model LD101C is fitted as standard with a quiet, low speed fan assembly with double width, double inlet blowers, with self-aligning ball bearings and factory-certified dynamic balance. The fan motor is mounted on a fan deck and incorporates an adjustable slide rail mechanism that enables pulley sheave alignment and belt tensioning.

The fan deck is isolated from the main frame assembly by means of rubber buffer vibration isolators, strategically positioned to minimise transmission of vibration between the fan deck and the cabinet assembly.

Cooling coil

The advanced design arrangement of the cooling circuits provides maximum coil area for precise control of temperature and humidity. With maximum face area, the low velocity air drawn through the coil is given the most effective exposure with less turbulence and greater sensitivity in the cooling and dehumidification process.

The slab coil with aluminium fins on copper tubes is designed for the high sensible heat ratio required by e.g. critical spaces. A non-ferrous condensate pan is standard with all slab coils.

Electric panel

The high voltage compartment contains the contactors, transformers, overloads and all other high voltage

components. Each high voltage component is protected by a separate overcurrent protective device.

Microprocessor controller (Level 5)

The Liebert Sensible Cooler environmental control system is microprocessor based and can be programmed to match the unique needs of any application. This processor integrates the separate mechanical and electrical components into a 'state-of-the-art' conditioned space support system that controls and monitors temperature, humidity, air flow and air cleanliness.

This Liebert manufactured control system offers a tailored and well proven advance in reliability and control flexibility allowing the Sensible Cooler to modify its performance in response to changing critical space conditions.

The monitoring system allows local monitoring and programming of the following room conditions:

- Temperature (°C)
- Temperature setpoint (4°C - 29°C)
- Temperature sensitivity (1°C - 3°C)
- Humidity (%RH)
- Humidity setpoint (20%RH - 80%RH)
- Humidity sensitivity (1%RH - 5%RH)
- Humidifier flush rate - from 11 to 25. Adjusts the humidifier flush rate between 110% and 250% of the humidifier pan volume

The parameters are annunciated on an LED numerical display. Normal operating modes are indicated by LEDs on the monitor panel. Alarm conditions activate an audible and visual indicator. An Alarm/Silence button will deactivate the audible alarm but the visual indicator will remain lit until the problem is corrected.

The following alarms are standard:

- High temperature
- Low temperature
- High humidity
- Low humidity
- Change filters
- Loss of air flow
- Temperature sensing error
- Humidity sensing error
- Humidifier/Local alarm (customer accessible)
- High head pressure - common alarm (compressor systems only)

The control system can be interfaced with the Liebert SiteScan site monitoring product, enabling control and alarm functions to be remotely monitored and programmed at a central location.

Note: Full details of these and all other features of the Level 5 Controller are contained in the Level 5 Controller Operation Manual (P/N SLS-ELV5-2E) supplied with the Sensible Cooler unit.

Note: A number of optional extensions are available with the Level 5 Controller, the Extended Alarm Board, and the Autochangeover Board, refer to the optional equipment section of this manual for more details.

Technical description - (continued)

Filters

The standard 50mm deep-pleated filters with an efficiency of 30% EU4 (based on Eurovent 4-5) can be changed quickly and easily. Removal is through the front of the unit.

Air flow switch

The air flow switch is located in the electric panel and consists of a diaphragm switch and interconnecting tubing to the blower scroll. The normally-open contacts close at a preset velocity which allows the controller to apply power to the reheat, cooling and humidifier circuits. The normally closed contacts will activate the alarm system if the air flow is interrupted. In this event the controller will de-energise and the unit will be shut down.

Modulating motorised valve

The chilled water valve provides equal percentage control action in response to room temperature and humidity as sensed by the microprocessor. This results in a proportional ratio of capacity to stem travel. The valve includes an operating linkage and electric motor.

Note: Please check with Liebert Applications Engineering if it is envisaged that the unit is likely to be used under conditions that differ significantly from standard.

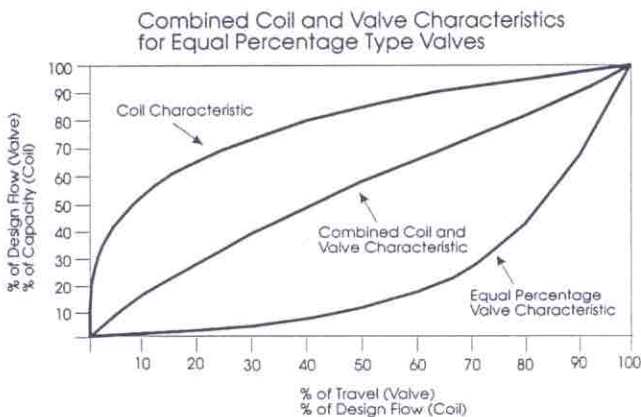


Figure 2 - Equal percentage valve characteristic

Line insulation

All chilled water piping within the unit is fully insulated to ensure full system capacity and prevent condensation.

Air volume adjustment

Airflow adjustment baffles (LD 031C to LD 091C only) are available for the manual setting of air delivery to suit specific applications.

Thus for an unmanned environment the SHR and total capacity can be kept to a maximum by running the blower with the baffle fully open. If there is a latent load, the SHR can be tuned to alter the volume of air moved by the fan(s) so that it matches the system to the 'latent load'.

Infrared humidifier

High intensity quartz lamps over the stainless steel humidifier pan add clean, particle-free vapour to the computer room environment within 6 seconds of a call for humidification from the controller. The quartz lamps provide radiant energy that evaporates the water and adds a pure vapour to the air bypassing the cooling coil, regardless of the water quality. This prevents 'over-humidification' of the computer room.

Water make-up valve

A water make-up valve is a solenoid valve which is installed in the humidifier water supply line and is automatically closed if the water level in the pan exceeds a preset level.

Autoflush humidifier cleaning system

The autoflush system will periodically flush the humidifier pan with water to prevent build-up of minerals. Because water conditions vary, the amount of water flushing through the system can be programmed to match local needs.

Water quantities between 110% and 250% of the quantity needed for humidification can be selected. Operation of the flushing system is then automatic and no further adjustment is necessary.

To operate properly, the autoflush humidifier requires a water source that can deliver at least 2 litres per minute with a minimum pressure of 1.38 bar (138 kPa).

Operation

Operation of the autoflush is divided into four steps beginning with a call for humidification:

1. If the humidifier has not been activated during the previous 30 hours, the autoflush will flow water into the pan for 30 seconds. This will provide a minimum amount of water and prevent heat damage to the humidifier pan. Humidifier lamps are OFF during this stage of operation.
2. If the humidifier has been activated within the previous 30 hours, Step 1 is bypassed. The autoflush will flow water into the pan through the make-up valve for 4 minutes (based on the length of time between humidifier activations). The humidifier lamps are ON and the humidifier is operational during this period. When the pan is filled (the fill cycle has timed out), the water make-up valve is closed.
3. The water make-up valve remains OFF and the humidifier lamps are on for a maximum of 8 minutes.
4. After the 8 minute cycle, the autoflush adds water to the pan to replenish the water used in humidification and flushes the pan of mineral solids. The amount of water is adjustable from 110% to 250% in increments of 10%. At the end of this cycle, the make-up valve is closed.
5. Steps 3 and 4 are repeated for as long as humidification is required.

Technical description - (continued)

Electric reheat coil

The single-stage, three element reheats are of rigid, fin-tubular design that have extended operational life. The reheat has ample capacity to maintain room dry-bulb conditions during a system call for dehumidification. Without cooling, three heating elements give an accurate controlled response to the requirements of the computer room. The low-watt density, phase balanced, electrically enclosed elements are surrounded by the tube and fins, reducing sheath temperatures (215.5°C) and eliminating ionisation.

Dehumidification

Dehumidification takes place following a signal from the microprocessor controller that fully opens the chilled water valve.

Optional equipment

Belt driven fan

A belt driven variable speed fan (standard on LD 101C) is available to overcome high external resistances to airflow caused by small ductwork and underfloor restrictions.

Condensate pump

The condensate pump, mounted in the bottom of the system, is used for condensate water only. Complete with sump, motor and pump assembly and automatic control. The pump has a capacity of 6.1 metres of head.

Liqui-tect/water detection sensors

WARNING

Do not use near flammable liquids or for flammable liquid detection.

The Liebert LT series water detection modules are quickly installed, work simply and provide reliable warning of water leaks. A simple connection presents alarms at the environmental control unit, or at a SiteScan monitor.

LT400 & LT400S

The LT400 and LT400S provide water detection at critical points under a raised floor. Two corrosion resistant, gold plated probes detect water and signal the monitoring system, allowing immediate action to prevent water damage. The LT400S supervised detector will also signal power loss or circuit failure, for a completely self-monitored system.

LT450S

The LT450S supervised zone water detector uses a flexible water sensing cable, allowing protection for hard to reach areas and sensitive areas that require protection against water damage. In addition to water detection, the system also signals loss of power or a cable fault.

Adjustable floorstand

Floor stands are available in heights from 229mm to 610mm in 76mm increments, and are adjustable for 38mm. Allows for installation and connection of the Sensible Cooler prior to installation of the raised floor.

Building energy management system interface

The Liebert microprocessor control system can be expanded so that a communications network can be established. This allows Liebert environmental equipment to communicate with any industrial standard building management system. A range of standard interface equipment is available. Consult your Liebert sales representative.

Smoke detector

Upon sensing the presence of smoke in the conditioned space, the smoke detector will activate the alarm system and shut down the environmental control system.

Firestat

The Firestat is a bi-metal operated temperature sensing device with a normally closed switch contact that is connected between terminals 37 and 39 on the PCB (Level 5). This device will shut down the entire unit if the inlet air temperature exceeds a preset value.

Hot water reheat

These economical hot water reheats have the capacity to maintain dry bulb conditions when the system is calling for dehumidification without cooling. The reheats are controlled by two on-off, three-way valves from the microprocessor control panel. The system is completely pre-piped and includes a Y-type strainer. The reheat coil is constructed of copper tubes with aluminium fins.

Dehumidification

Dehumidification takes place following a signal from the microprocessor controller that fully opens the chilled water valve and operates the bypass damper, if fitted. The reduction in air volume over the cooling coil and the increased water flow rate, combine to reduce the air temperature over the coil to its dew point.

Electrode boiler steam humidifier

The electrode boiler steam humidifier includes automatic water level sensing and automatic flushing. The humidifier produces clean particle free steam at an adjustable rate of output from 30% - 100%. Water usage is kept to a minimum by using programmed unit operations. The water level is maintained automatically using current sensing.

Flow switch

The flow switch will activate the alarm system and/or shut down the unit should the chilled water supply be interrupted. The switch is factory wired and mounted in the chilled water valve compartment.

Technical description - (continued)

Optional equipment (continued)

Removable side panels

To allow greater access to the coil manifolds and return bends, removable side panels are available as an option. The panels are held in place by 2 Dzus fasteners at the top and slot into a channel at the bottom.

High pressure applications

For special applications, a high pressure three-way modulating valve can be provided. This valve is designed for up to 27.56 bar (2756 kPa) water pressure.

High efficiency filters and pre-filters

Optional 100mm EU7 (Eurovent 4-5 standard) filters are available for all models. Pre-filters (50mm EU3 - 20% Eurovent 4-5) are available with the standard 50mm filters.

Microprocessor control system (Level 15 graphics)

The Level 15 Microprocessor Controller sets even higher standards in purpose-designed control systems for precision air-conditioning. It simultaneously monitors the critical space and signals alarms either locally or remotely. The graphics screen displays all the major parameters, including symbolic representation of unit functions, such as heating, cooling etc; in addition temperature and humidity variations with time can be presented graphically on the screen. All diagnostic procedures, including the checking of 24V input and output signals and the microprocessor itself, can be run from the front panel

Features

- Backlit LCD display
- User interface via membrane keys
- Battery-backed clock for date/time and real time functions
- Password control for setpoints, and unit/control setup and diagnostics
- Graphics display can provide graphs of temperature and humidity over a 24 hour period, as well as graphs of 4 separate user-defined analogue inputs

Selectable control logic

Fuzzy logic - The fuzzy logic control algorithm is based on a logical system which emulates the human thought process using a natural language structure. A Fuzzy Logic Controller (FLC) provides a means of converting a linguistic control strategy, based on expert knowledge/experience, into an automatic control strategy.

The measured parameters/states from the controlled system are converted into linguistic values, which in conjunction with the Database of Experience, are used by the Decision Making Logic to evolve a control action. This process can be summarised as: [IF {a given set of conditions occur} THEN (based on previous knowledge/experience) {a logical set of consequences can be inferred}].

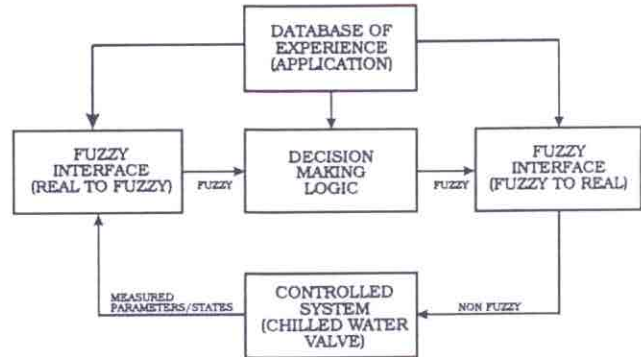


Figure 3 - Fuzzy logic control algorithm

The advantages of Fuzzy Logic over Conventional Logic are as follows:

- Fuzzy Logic uses a more detailed description of the controlled process in its control algorithm and therefore greater precision regulation of the controlled parameter (temperature/humidity) is possible
- Reduced "hunting" or oscillating of the control system due to the adaptive nature of the FLC
- Reduced re-positioning of valves etc. and hence improved reliability and service-life of components

Programmable P.I.D. - (proportional integral derivative). Immediate proportional response with an integral action which continuously adds/subtracts a small amount of cooling/heating to the total control output until the temperature is at setpoint. The derivative action increases the control output signal depending on the rate of change of the controlled parameter. The amount of integral action and derivative action is selectable for a given application.

Proportional control - controller output is proportional to the difference between the required setpoint and the actual measured values.

Programmable load control

- Programmable auto restart
- Sequential load activation after power failure to minimise inrush currents
- Compressor sequencing control
- Programmable winter start delay for different climates
- Short cycle control

Refrigerant circuit protection

- Override of compressors to provide emergency cooling
- Compressor short cycle control
- Automatic compressor sequencing on multi-stage units

Technical description - (continued)

Optional equipment (continued)

Control accuracy

- Humidity control can be based on relative or absolute humidity
- Choice of control algorithms, including Fuzzy Logic
- Sensor calibration for both temperature and humidity

Status information

The status information provided includes:

- Graphical display of percentage of operation time in each mode
- Unit operational status for: heating, cooling, humidification, dehumidification, Econocoiling, etc.
- Run time on loads for: compressors, main fan, humidifier, reheats, chilled water valves, Econocoil valves, etc.
- Four programmable analogue inputs (4 - 20mA or 0 - 10V DC or 0 - 5V DC)
- Graphical display of Temperature/Humidity and all analogue inputs

Alarms

The microprocessor activates an audible and visual alarm in the event of any of the following conditions:

- High or low temperature
- High or low humidity
- High compressor head pressure (compressor 1 and 2)
- Humidifier problem
- Loss of air flow
- Change filters
- Manual override
- Compressor short cycle
- Compressor overload 1 and 2
- Main fan overload
- Low suction pressure
- Four customer programmable alarms
- Short cycle alarm

Alarm Features

- Alarm prioritisation (Urgent/Non Urgent)
- Programmable time delay for each alarm
- Programmable alarm disable for each alarm
- Common alarm relay with the ability to select any alarm(s) to energise it
- Alarm history log of previous alarms including date and time stamp
- Graphical display of Water Detection including a room floor plan

Remote Monitoring

- SiteScan port for the provision of all status and alarm information, and facilities for the remote adjustment of temperature and humidity setpoints and sensitivity, high and low alarms, control algorithms, alarm setups, etc.
- Interfaces with building energy management systems via an ECA2 communications card or the SiteScan data concentrator

Note: Full details of these and all other functions of the Level 15 Controller are provided in the Level 15 Graphics, Controller Operations Manual (P/N SLS-EG15-2E).

SiteScan

SiteScan is an on-line management centre for monitoring and controlling all support systems in a large data processing installation. The equipment provides early warning alarms and total site management data.

SiteScan is a programmable, menu-driven and up-gradable, software-based system which uses a microcomputer as the central processing unit.

Four primary site management programs are built into the SiteScan system.

Alarm functions—provide instant warning of potential problems. A seven-level selection of options in response to each alarm offers total flexibility in designing a customised alarm system.

Control functions—allow critical setpoints and sensitivities to be adjusted by remote control for dynamic, single-point site management. Password access preserves site security.

Status functions—provide complete information on all critical space support systems, including real-time status of all monitored parameters and any existing alarm conditions.

History functions—offer database management capabilities. These functions track, store and graphically display crucial data and trends for site management activities such as capacity analysis, growth predictions and energy management.

SiteScan makes full use of its personal computer-based central processor features; including RS-232 communications and other output ports.

Extended alarm board (Level 5 only)

The extended alarm board provides volt-free changeover contacts for all individual alarm and status conditions. This allows the air conditioning unit to be hard-wired into a building management system. For full details refer to the Level 5 Controller Operations Manual (P/N SLS-ELV5-2E).

Autochangeover board (Level 5 only)

The autochangeover board is a hard-wired option which transfers environmental conditioning control to a standby unit in the event of any common alarm. For further details, contact your local Liebert representative.

Technical data

		LD031C	LD041C	LD061C	LD071C	LD081C	LD091C	LD101C
CAPACITY DATA kW @ 7.2°C EWT, 12.8°C LWT								
24.0°C DB 16.9°C WB 50% RH	Total	33.6	47.2	57.7	76.8	80.1	106.4	118.4
	Sensible	33.6	40.4	54.8	64.3	80.1	89.2	101.0
	Flow Rate l/s	1.4	2.0	2.5	3.3	3.4	4.5	5.0
	Press. Drop kPa	31.3	59.8	54.3	67.8	33.7	68.6	83.6
24.0°C DB 16.1°C WB 45% RH	Total	32.2	41.5	54.1	66.6	76.9	92.3	104.0
	Sensible	32.2	41.5	54.1	66.6	76.9	92.3	104.0
	Flow Rate l/s	1.4	1.8	2.3	2.8	3.3	3.9	4.4
	Press. Drop kPa	29.4	47.2	48.1	52.2	31.7	52.9	65.9
22.0°C DB 15.5°C WB 50% RH	Total	27.2	35.5	45.9	57.0	65.1	79.0	88.8
	Sensible	27.2	35.5	45.9	57.0	65.1	79.0	88.8
	Flow Rate l/s	1.2	1.5	2.0	2.4	2.8	3.4	3.8
	Press. Drop kPa	21.5	35.2	35.8	39.3	23.3	39.7	49.3
CABINET *								
Length (mm)		1272	1272	1882	1882	2516	2516	2516
Height (mm)		1880	1880	1880	1880	1880	1880	1880
Depth (mm)		880	880	880	880	880	880	880
Weight (kg)		420	420	610	610	830	830	830
FANS								
Standard air volume (m ³ /h)		10000	10000	16000	15500	23700	20500	25000
External Static Pressure (Pa)		75	75	75	75	75	75	75
Quantity		1	1	2	2	2	2	2
MOTORS								
Standard (direct drive):								
Rating (kW)		2.2	2.2	4.0	4.0	5.5	5.5	
Optional (belt driven):								
Rating (kW)		2.2	2.2	4.0	4.0	5.5	5.5	7.5
Number of belts		2	2	2	2	2	2	2
REHEATERS								
Standard (electric):								
Rating (kW) @ 400V		7.5	7.5	12.5	12.5	12.5	12.5	25.0
Number of stages		1	1	1	1	1	1	2
Number of elements		3	3	3	3	3	6	6
Optional (electric):								
Rating (kW) @ 400V		15.0	15.0	25.0	25.0	25.0	25.0	N/A
Number of stages		2	2	2	2	2	2	N/A
Optional (hot water @ 80°C EWT, 24°C EAT):								
Capacity (kW)		16.5	16.5	27.7	27.7	36.3	31.3	44.0

* These dimensions are the unit external dimensions including panels.

Note: EWT = Entering Water Temperature, EAT = Entering Air Temperature.

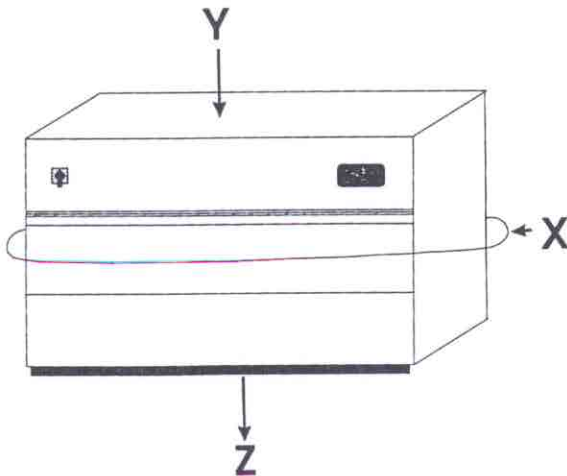
Technical data (continued)

	LD031C	LD041C	LD061C	LD071C	LD081C	LD091C	LD101C
HUMIDIFIERS							
Standard (Infrared) @ 400V:							
Output (kg/hr)	5	5	10	10	10	10	10
Optional (electrode steam boiler) @ 400V:							
Output (kg/hr)	4.5	4.5	9.0	9.0	9.0	9.0	9.0
VALVES							
Size (in)	1 ¼	1 ¼	1 ½	1 ½	2	2	2
Cv	13.4	13.4	27.5	27.5	41.0	41.0	41.0
CONNECTIONS (SUPPLY & RETURN)							
Size (in)	1 ¾	1 ¾	1 ⅝	1 ⅝	2 ¼	2 ¼	2 ¼
FILTERS							
L x h (50mm standard EU4)	565 x 585	565 x 585	565 x 585	565 x 585	565 x 585	565 x 585	565 x 585
Quantity	0	0	4	4	8	8	8
L x h (50mm standard EU4)	520 x 585	520 x 585	520 x 585	520 x 585	520 x 585	520 x 585	520 x 585
Quantity	4	4	2	2	0	0	0
Total quantity	4	4	6	6	8	8	8
Filter area m ²	1.21	1.21	1.93	1.93	2.64	2.64	2.64
Effective surface area m ²	3.65	3.65	5.79	5.79	7.93	7.93	7.93
Filter velocity m/s *	2.6	2.6	2.6	2.6	2.8	2.5	2.7
Efficiency (Eurovent 4-5)	30%	30%	30%	30%	30%	30%	30%
COOLING COIL							
Face area (m ²)	1.07	1.07	1.69	1.69	2.32	2.32	2.54
Face velocity (m/s)	2.6	2.6	2.6	2.6	2.8	2.5	2.7
Rows	3	5	3	5	3	5	5
FULL LOAD AMPS (FLA) @ 400V standard options							
Fan motor	7.0	7.0	9.6	9.6	13.0	13.0	15.2
Reheat	10.3	10.3	17.2	17.2	17.2	17.2	34.2
Infrared humidifier	6.1	6.1	12.2	12.2	12.2	12.2	12.2
Total	23.4	23.4	39.0	39.0	42.4	42.4	61.6

* Based on face area

Sound data

		Sound Power Levels dB(A)								
Hz		31.5	63	125	250	500	1000	2000	4000	Σ
LD031C	dBX	46.8	51.8	55.4	56.1	59.4	59.6	54.2	47.6	64.8
	dBZ	46.9	54.9	58.8	60.7	64.1	65.6	62.9	57.3	70.4
	dBZ	45.4	58.1	64.8	68.9	73.3	74.6	73.2	69.6	79.6
LD041C	dBX	47.0	52.0	55.7	56.4	59.7	59.9	54.5	47.8	65.1
	dBZ	47.1	55.2	59.1	61.0	64.4	65.9	62.2	57.6	70.5
	dBZ	45.9	58.4	65.1	69.2	73.6	74.9	73.5	69.9	79.9
LD061C	dBX	49.9	55.1	59.0	59.7	63.2	63.5	57.5	50.7	68.6
	dBZ	50.0	58.5	62.7	64.6	68.2	69.8	66.9	61.0	74.5
	dBZ	48.7	61.9	69.0	73.3	78.0	79.3	77.9	74.0	84.2
LD071C	dBX	49.7	54.9	58.7	59.5	62.9	63.2	57.2	50.5	68.3
	dBZ	49.8	58.2	62.5	64.4	67.9	69.5	66.6	60.7	74.2
	dBZ	48.5	61.6	68.7	73.0	77.7	79.0	77.6	73.7	83.9
LD081C	dBX	50.6	56.0	59.8	60.6	64.1	64.4	58.3	51.5	69.4
	dBZ	50.7	59.3	63.7	65.6	69.2	70.8	67.9	61.9	75.4
	dBZ	49.4	62.8	70.0	74.4	79.2	80.5	79.1	75.1	85.4
LD091C	dBX	48.9	54.2	57.9	58.7	62.1	62.4	56.3	49.7	67.5
	dBZ	49.0	57.4	61.7	63.5	67.0	68.6	65.6	59.7	73.3
	dBZ	47.8	60.8	67.8	72.1	76.7	78.0	76.4	72.4	82.9
LD101C	dBX	51.2	56.8	60.6	61.4	65.0	65.4	59.1	52.3	70.3
	dBZ	51.3	60.1	64.6	66.4	70.1	71.9	68.9	62.9	76.4
	dBZ	50.0	63.7	71.0	75.4	80.3	81.8	80.2	76.2	86.6



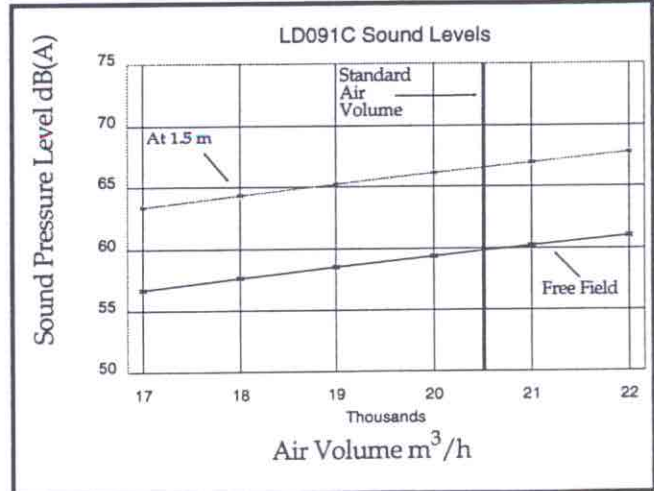
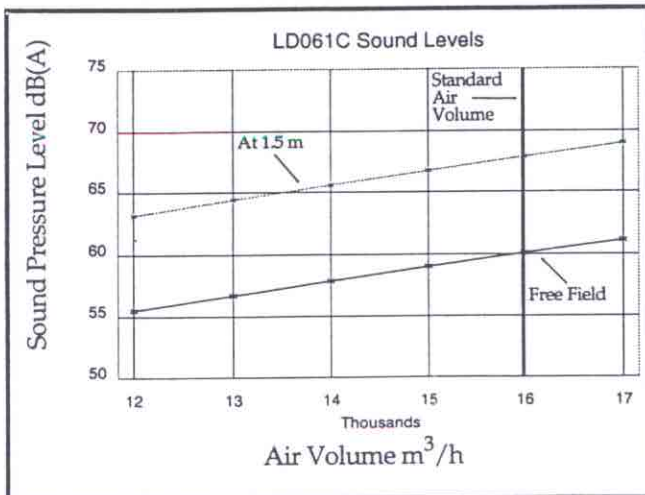
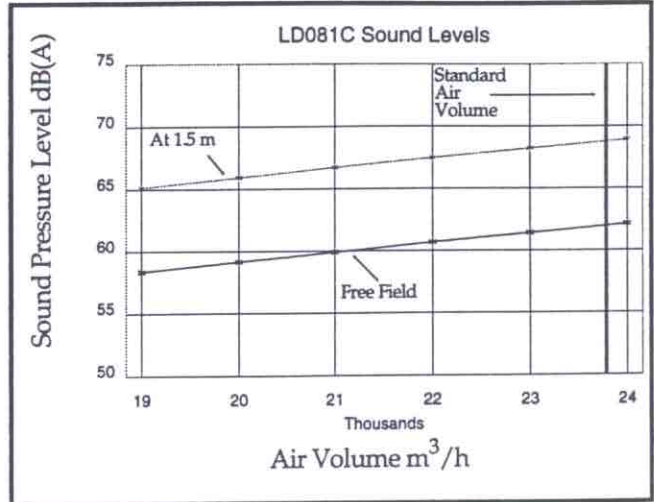
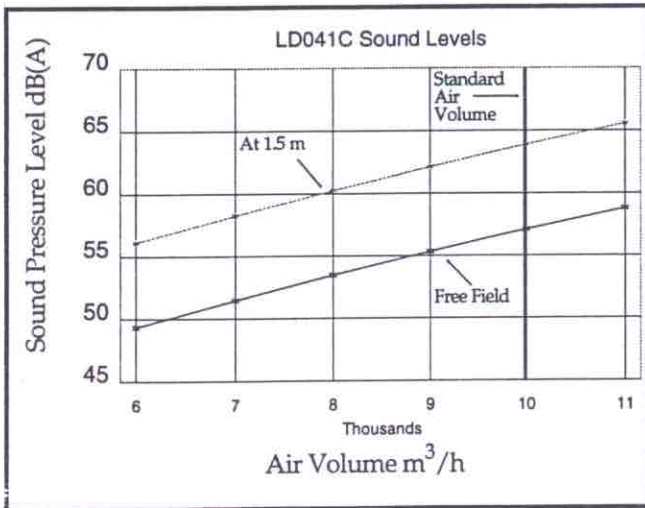
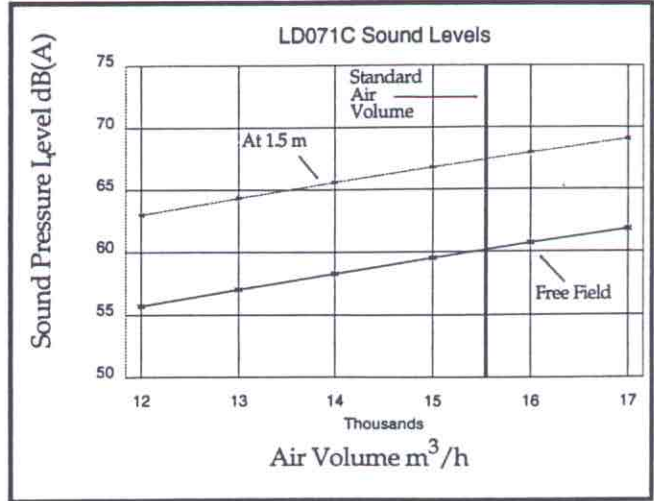
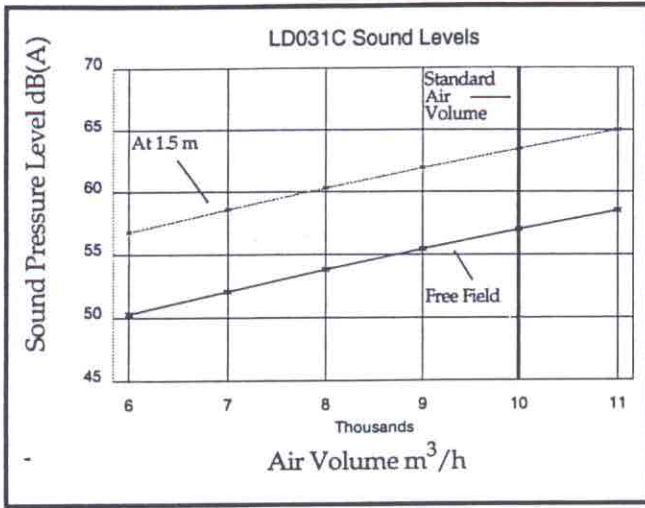
Note:

Sound power to sound pressure (free field) relationship used:

$$L_p = L_w + 10 \log_{10} \frac{K}{4\pi(d^2)} + \frac{4}{A}$$

Where for free field $K = 1$ and $\frac{4}{A} = 0$.

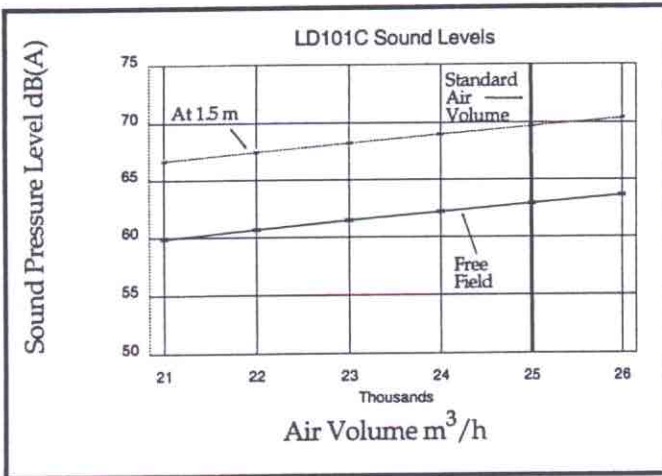
Sound data (continued)



Notes:

1. Sound pressure levels (at 1.5m) were measured in a room with a reverberation time of 0.476 seconds and a net volume of 270m³.
2. Sound pressure levels are also applicable to units in the upflow configuration provided that the discharge is into a ceiling void or ducted away.
4. For unit standard air volumes and capacities, refer to the unit capacity section of this manual.
5. For more information on air volumes other than standard, consult the Cork Applications Engineering Department.
6. The above graphs are for a constant 75 Pascals external static pressure, all figures are quoted at standard operating conditions.
7. Free field sound pressure levels are calculated from the dBX and dBY Sound Power components.

Sound data (continued)



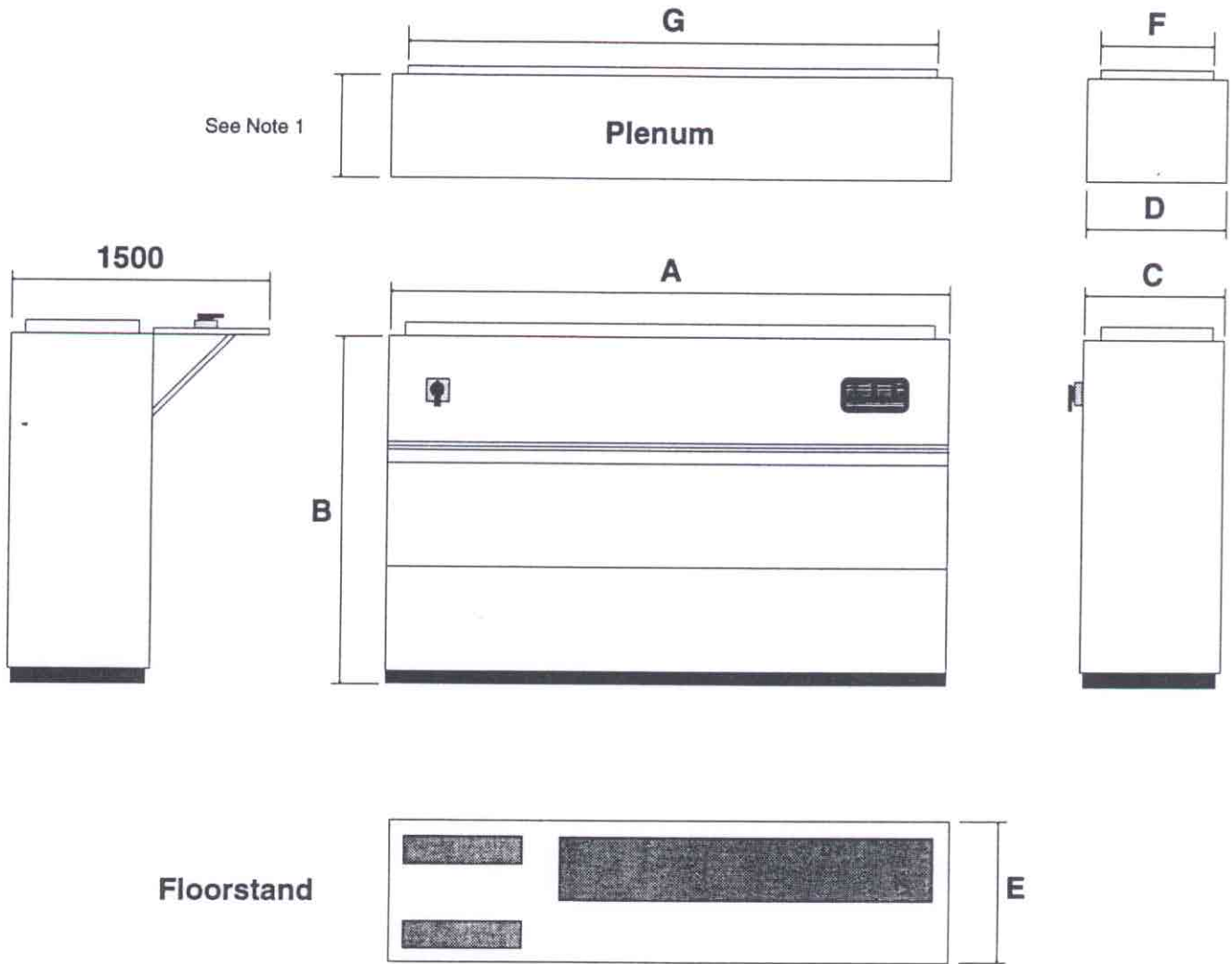
Sound Pressure Levels dB(A) @ 1.5m										
Hz	31.5	63	125	250	500	1000	2000	4000	Total	NR *
LD031C	31.9	41.7	46.9	53.5	58.7	58.1	57.4	54.2	63.5	58
LD041C	32.2	41.9	47.1	53.7	59.0	58.4	57.7	54.5	63.9	58
LD061C	33.9	44.4	49.9	56.9	62.6	61.9	61.2	57.8	67.8	62
LD071C	33.7	44.2	49.7	56.7	62.3	61.6	60.9	57.5	67.4	62
LD081C	34.4	45.0	50.7	58.0	63.8	63.1	62.1	58.6	68.7	63
LD091C	33.3	43.5	49.1	56.1	61.8	61.1	60.1	56.7	66.5	61
LD101C	34.9	45.6	51.4	58.8	64.8	64.0	62.9	59.4	69.7	63

* NR's quoted are at 3m distance.

Notes:

1. Sound pressure levels (at 1.5m) were measured in a room with a reverberation time of 0.476 seconds and a net volume of 270m³.
2. Sound pressure levels are also applicable to units in the upflow configuration provided that the discharge is into a ceiling void or ducted away.
4. For unit standard air volumes and capacities, refer to the unit capacity section of this manual.
5. For more information on air volumes other than standard, consult the Cork Applications Engineering Department.
6. The above graphs are for a constant 75 Pascals external static pressure, all figures are quoted at standard operating conditions.
7. Free field sound pressure levels are calculated from the dBX and dBY Sound Power components.

Dimensional data



Note: Floorstand height must be specified by customer. See page 4.

MODELS	DIMENSIONAL DATA (mm)						
	A	B	C	D	E	F	G
LD 031C and LD 041C	1272	1880	880	864	831	813	1168
LD 061C and LD 071C	1882	1880	880	864	831	813	1778
LD 081C, LD 091C & LD 101C	2516	1880	880	864	831	813	2413

Notes:

1. Standard nominal plenum heights are 510mm, 578mm and 883mm.
2. Dimensions C and A are external unit dimensions, i.e. to the outside of exterior panels.
3. The above data is intended as a guide only. For specific or non-specified dimensions, refer to applications engineering.
4. For further details, refer to Liebert Submittal Drawing no. L13097CA.

Electrical schematics

