# Liebert.

# Precision Cooling

# **PeX Large Frame**

50Hz TECHNICAL DATA



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# Introduction

he Liebert PeX is the next generation precision environmental control system from Emerson Network Power. Proudly designed and built in Australia, the PeX is the latest in a long line of advanced products from the Liebert family. Incorporating the same quality and reliability that has become synonymous with the Liebert name, the PeX range utilises the latest technology, system components, and manufacturing processes.

PeX units are specifically developed for applications requiring close environmental control, such as:

- \* Computer rooms
- \* Telecommunications equipment
- \* Clean rooms
- \* Pharmaceutical
- \* Manufacturing
- \* Test rooms
- \* Laboratories

Liebert PeX is the product of 5 years of extensive research conducted with leading air conditioning bodies, experts, consultants and major corporations.



# The PeX Advantage

Only the Liebert PeX can give you all these advantages:

- Made in Australia. The Liebert PeX is designed and manufactured in Australia.
- Comprehensive local support. Full pre-sales and post-sales support is readily available, anytime you need it.
- Customisation expertise. PeX units can be customised to suit your requirements, with expertise and assistance from our local R&D and Engineering teams.
- Full Service capability. Factory-trained
   Customer Engineers provide backup support
   24 x 365.
- Established company. Emerson Network
   Power has been designing and manufacturing
   precision environmental control systems
   for over 30 years.

The technical data presented in this manual is based on typical evaporator coil air entering conditions. Should equipment selections be required for other conditions, refer to the 'PeX Selection Program' or contact your local Sales Office for assistance.

# Features and Benefits

### Intelligent Controller

The latest CEMS100 controller offers even higher levels of control, monitoring and flexibility for critical applications, with increased memory and communications abilities. In-System-Programming (ISP) technology supports fast program uploads via a PC without the need to change-out memory chips. A choice of control options is available to provide comprehensive environmental monitoring and control ranging from single zone duty/standby management through to a fully integrated network of up to 40 units.



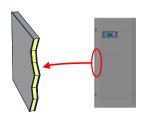
#### **Modular Construction**

Three bay units may be constructed as your load capacity grows. One and two bay building blocks form the basis of the PeX, so you can rely on the PeX to grow with you. In addition, common components are utilised across the model range, thus minimising stocking of replacement parts by the end user.



### **Structural Rigidity**

Adding to the proven benefits of riveted construction technology, unit rigidity is further enhanced thanks to double-skinned side panels.



# High Energy Efficiency

Optimum heat exchanger configurations coupled with innovative compressor technology (Copeland Compliant Scroll), and the latest in CFD (Computational Fluid Dynamics) techniques, has resulted in maximising the performance of the unit, whilst minimising energy consumption.

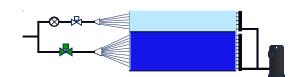


## Multiple Cooling Stages

One and two compressor models provide two stage operation (0%-50%-100%). Three compressor models provide three stage operation (0%-33%-67%-100%).

# Specific Dehumidification Cycle

Compressorised models employ specific split coil configurations, allowing latent cooling capacity to be substantially increased but only as required so that energy consumption is minimised whilst providing close temperature and humidity control.



### **High Sensible Heat Ratios**

All models operate high sensible heat ratios to match the low latent loads of modern computer rooms and telephone exchanges etc. With low latent capacity, little moisture is removed from the air so that humidity levels can be maintained without extra humidification, thereby ensuring lower energy consumption.

### High/Constant Airflow

High airflow achieves favourable sensible heat ratios and provides maximum air change rate. This ensures that variations in room load are quickly detected and responded to. Airflow is constant under all operating modes, including dehumidification, to provide even air distribution across the room resulting in optimal temperature and humidity control.



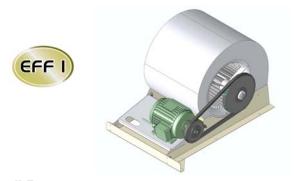
# Features and Benefits

#### Fan and drive

The innovative belt drive system automatically provides high belt tension during startup and then maintains constant tension when operating speed has been reached, eliminating slippage and greatly extending belt life. The fan belt can be changed in seconds without the use of tools.

Forward curved centrifugal fans are used for high efficiency and quiet operation. Each fan is dynamically balanced and has a separate motor and drive thereby allowing the unit to continue operating in the unlikely event of a motor/drive failure. Three phase MEPS compliant electric induction motors (EFF1 efficiency) with IP55 degree of protection and class F insulation complete the package.

Insulated static regain ducts in floor discharge models reduce noise, turbulence and increase fan efficiency.



## Small Footprint

The unit's inherent compact design, together with the ability to undertake all service work from the front of the unit rather than from the side or rear, results in minimal space requirements and the possibility of placing units side by side or hard up against walls.

#### Superior Serviceability

Front doors are now hinged, and also removeable, offering improved service access to the unit internals. Air cooled models employ rigidly mounted isolation valves to aid installation and servicing. Filter driers are oversized to cope with high refrigerant charges, typical of extended length pipe applications, and employ 'rotalock' connections for ease of removal. Access panels for the fan drive enables the unit to be serviced whilst in operation. Air filters are withdrawable from the front of the unit, allowing floor discharge units to be connected to return air ductwork.

### Electrode humidifiers

Energy efficient humidification, with pure steam generated by direct acting electrodes in boiling water, ensures low running costs and fail safe operation (electrodes will not function without water). The high temperature of the boiling water prevents the build up of bacterial growth and eliminates the need for chemical treatment. Automatic flush cycle allows application to a wide range of water conditions (conductivity and turbidity). The fully serviceable design ensures quick and cost effective maintenance. All PeX humidifiers are approved for direct connection to potable water supplies.



### High Reliability

Proven, quality components are used throughout and careful consideration given to their service requirements, thus ensuring an absolute minimum of unit downtime.

#### R407C Refrigerant Option

As an alternative to the base HCFC R22 charged systems, all models can be supplied with zero ODP (ozone depletion potential) HFC R407C refrigerant.



# EMC (Electro Magnetic Compatibility)

The PeX product complies with mandatory radiated and conducted emission levels for EMC.



# **Unit Numbering System**

Example code: PeX 250FA-100-M

| PeX | 2              | 50                | F         | Α            | - 100         | - M              |
|-----|----------------|-------------------|-----------|--------------|---------------|------------------|
|     | No. of<br>bays |                   | Air Path  | Cooling type | Controls      | Supply Voltage   |
|     | I = I bay      | cooling           | F = Floor | A = Air      | 100 = CEMS100 | M = 380-415/3/50 |
|     | 2 = 2 bay      | capacity<br>in kW | R = Room  | W = Water    |               |                  |
|     | 3 = 3 bay      | III KVV           | D = Duct  |              |               |                  |

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| PeX xxx Flo                | oor and  | d Roo           | m Un     | its        |          |           |                |         | Air       | & Wa     | ater C    | ooled   | - R22  |
|----------------------------|----------|-----------------|----------|------------|----------|-----------|----------------|---------|-----------|----------|-----------|---------|--------|
| Model Size                 |          | 120             | 125      | 130        | 135      | 240       | 245            | 250     | 260       | 270      | 380       |         | 3100   |
| Rated Unit I               | Perforn  |                 |          |            |          | •         | 5              |         |           | _, ,     | 200       | J , U   |        |
| 24°C DB, 17.               |          |                 |          |            |          |           |                |         |           |          |           |         |        |
| Total                      |          | 19.4            | 23.1     | 30.7       | 34.8     | 39.1      | 46.3           | 52.6    | 61.9      | 72.I     | 78.6      | 92.6    | 105.8  |
| Sensible                   |          | 19.2            | 23.0     | 27.9       | 29.6     | 38.8      | 45.9           | 49. I   | 55.8      | 61.4     | 73.5      | 83.7    | 89.2   |
| 24°C DB, 16.4              | 4°C WB   | s, 45% l        | RH       |            |          |           |                |         |           |          |           |         |        |
| Total                      |          | 19.6            | 23.3     | 29.8       | 34.4     | 39.8      | 46.6           | 51.2    | 59.9      | 69.7     | 76.5      | 89.7    | 103.4  |
| Sensible                   |          | 19.5            | 23.1     | 29.6       | 31.9     | 39.5      | 46.3           | 50.8    | 59.5      | 65.3     | 75.9      | 89. I   | 95.3   |
| 22°C DB, 15.               | 5°C WB   | s, 50% l        | RH       |            |          |           |                |         |           |          |           |         |        |
| Total                      |          | 19.2            | 22.9     | 29.3       | 33.2     | 38.8      | 45.7           | 51.3    | 59.2      | 68.6     | 76.7      | 88.4    | 100.9  |
| Sensible                   |          | 19.1            | 22.7     | 27.4       | 29.1     | 38.5      | 45.4           | 49. I   | 54.8      | 60.2     | 73.5      | 82.2    | 87.7   |
| 22°C DB, 14.7              | 7°C WB   | , <b>45</b> % l | RH       |            |          |           |                |         |           |          |           |         |        |
| Total                      |          | 19.2            | 22.8     | 28.6       | 32.7     | 39.0      | 45.9           | 50.8    | 57.4      | 66.2     | 76. I     | 86.0    | 98.0   |
| Sensible                   |          | 19.1            | 22.7     | 28.4       | 31.0     | 38.7      | 45.6           | 50.4    | 57.0      | 63.5     | 75.5      | 85.4    | 92.6   |
| Fan Section                | - Forwa  | ard cu          | rved c   | entrifu    | ıgal far | ı, self-ı | tensior        | ning be | elt driv  | e, IP5   | 5 moto    | or      |        |
| Airflow - I/s              |          | 1,800           | 2,250    | 2,250      | 2,250    | 3,550     | 4,400          | 4,400   | 4,400     | 4,400    | 6,650     | 6,650   | 6,650  |
| Sound Level (2)            | Floor    | 43.4            | 45.7     | 45.7       | 45.7     | 47.3      | 49.0           | 49.0    | 49.8      | 50 I     | 50.7      | 51.2    | 51.4   |
|                            | Room     | 48.9            | 51.2     | 51.4       | 51.5     | 52.4      | 53.1           | 53.3    | 53.7      | 53.9     | 55.5      | 55.7    | 55.9   |
| Fan motor kW               | - ea     | 2.2             | 2.2      | 2.2        | 2.2      | 2.2       | 2.2            | 2.2     | 2.2       | 2.2      | 2.2       | /2.2    | 2.2    |
| No. of fans/mo             | tors     | I               | I        | I          |          | 2         | 2              | 2       | 2         | 2        | 3/        | 3       | 3      |
| <b>Evaporator</b>          | Coil - C | Соррен          | r tubes  | with r     | ifled b  | ore, lo   | ouvred         | alumi   | nium f    | īns      |           |         |        |
| Face Area - m <sup>2</sup> |          | 0.95            | 0.95     | 0.95       | 0.95     | 2.07      | ₹2.0           | 2.07    | 2.07      | 2.07     | 3.02      | 3.02    | 3.02   |
| No. of rows                |          | 2               | 2        | 3          | 4        | 2         | 2              | 2       | _3        | 4        | 2         | 3       | 4      |
| Fin series - FPI           |          | 14              | 14       | 14         | 11       | 14        | 14             | 14      | / i¥      | П        | 14        | 14      | П      |
| Face velocity -            | m/s      | 1.90            | 2.38     | 2.38       | 2.38     | 1.71      | 2.12           | 2.12    | 2.12      | 2.12     | 2.20      | 2.20    | 2.20   |
| Compressor                 |          | eland (         | Compl    | iant Sc    | roll     |           | V              |         |           |          |           |         |        |
| No. of Compre              |          | ´  _            |          | \ I        | I        | 2         | 2              | /2      | 2         | 2        | 3         | 3       | 3      |
| Unit cooling ste           | • / /    | /2              | 2)       | 2          | 2        | 2         | 2/             | 2       | 2         | 2        | 3         | 3       | 3      |
| Safety controls            |          | HP cut          | out (mai | nual rese  | et) 2,80 | 0 kPa     | 7              | LP cuto | out/in (a | uto rese | et) 140/4 | 120 kPa |        |
| <b>Humidifier</b> -        | Imme     | rsed e          | lectro   | le stea    | m ger    | erațo     | <u>r humi</u>  | difier  |           |          |           |         |        |
| Capacity - kg/h            | r        | 4.5 °           | 4.5      | 4.5        | 4.5      | 5         | 5              | 7.5     | 7.5       | 7.5      | 10        | 10      | 10     |
| Input power - k            | (W       | 3.3             | 3.3      | 3.3        | 3.3      | 3.8       | 3.8            | 5.6     | 5.6       | 5.6      | 7.5       | 7.5     | 7.5    |
| Setting - amps             |          | 9               | 9 \      | 9          | 9        | 6         | 6              | 9       | 9         | 9        | 12        | 12      | 12     |
| Heaters - Si               | ngle sta | ıge fin         | ned tu   | bular e    | electri  | c elem    | ent            |         |           |          |           |         |        |
| Capacity - kW              |          | 6               | 6        | <u>√</u> 6 | 6        | 9         | 9              | 9       | 9         | 9        | 9         | 9       | 9      |
| Filter - Dry               | media d  | dispos          | able G   | 4 perfo    | orman    | ce to 🛭   | <b>AS</b> 1324 | 1       |           |          |           |         |        |
| Size - mm                  |          |                 |          |            |          | 790       | x 790 x        | 100     |           |          |           |         |        |
| Qty                        |          | I               | I        | I          | I        | 2         | 2              | 2       | 2         | 2        | 3         | 3       | 3      |
| Air Cooled (               | Conden   | sers (3         | 3)       |            |          |           |                |         |           |          |           |         |        |
| 30°C                       | Single   | LS20            | LS25     | LS40       | LS40     | LS20×2    | LS25×2         | LS25×2  | LS40x2    | LS40x2   | LS25×3    | LS40×3  | LS40×3 |
|                            | Dual     | -               | -        | -          | -        | LD50      | LD60           | LD70    | -         | -        | -         | -       | -      |
| 35°C                       | Single   | LS25            | LS25     | LS50       | LS50     | LS25x2    | LS25×2         | LS40x2  | LS50x2    | LS50x2   | LS40x3    | LS50x3  | LS50×3 |
|                            | Dual     | -               | -        | -          | -        | LD60      | LD70           | -       | -         | -        | -         | -       | -      |
| 40°C                       | Single   | LS40            | LS50     | LS60       | LS70     | LS40×2    | LS50×2         | LS60×2  | LS70×2    | LS70×2   | LS60x3    | LS70×3  | LS70x3 |
|                            | Dual     | -               | -        | -          | -        | LD70      | -              | -       | -         | -        | -         | -       | -      |
|                            |          |                 |          |            |          |           |                |         |           |          |           |         |        |

| PeX xxx Floor a  | PeX xxx Floor and Room Units |        |        |        |        |               |        |         |        |        | Air & Water Cooled - R22 |        |  |  |
|--|------------------------------|--------|--------|--------|--------|---------------|--------|---------|--------|--------|--------------------------|--------|--|--|
| Model Size   | 120                          | 125    | 130    | 135    | 240    | 245           | 250    | 260     | 270    | 380    | 390                      | 3100   |  |  |
| Water Cooled Condenser - 316SS Brazed plate heat exchanger - 2 way WRV (4) |                              |        |        |        |        |               |        |         |        |        |                          |        |  |  |
| Water flow - I/s (5)   | 1.0                          | 1.2    | 1.6    | 1.8    | 2.0    | 2.3           | 2.7    | 3.1     | 3.6    | 4.0    | 4.7                      | 5.4    |  |  |
| Valve size   | 1"                           | 1-1/4" | 1-1/4" | 1-1/4" | Ι"     | 1-1/4"        | 1-1/4" | 1-1/4"  | 1-1/4" | 1-1/4" | 1-1/4"                   | 1-1/4" |  |  |
| Press drop - kPa   | 45                           | 33     | 54     | 67     | 46     | 33            | 39     | 55      | 66     | 39     | 55                       | 67     |  |  |
| Full Load Current - 380/415 Volts, 3 phase+N+E, 50 Hz Supply               |                              |        |        |        |        |               |        |         |        |        |                          |        |  |  |
| Air cooled (6)   | 26.3                         | 28.3   | 37.0   | 38.9   | 38.6   | 42.6          | 57.8   | 59.6    | 63.4   | 81.8   | 84.5                     | 90.2   |  |  |
| Water Cooled   | 23.6                         | 25.6   | 30.9   | 32.8   | 35.2   | 39.2          | 51.0   | 52.8    | 56.6   | 75.0   | 77.7                     | 83.4   |  |  |
| <b>Unit Connections</b>  | (7)                          |        |        |        |        |               |        |         |        |        |                          |        |  |  |
| Discharge line (out)   | 5/8"                         | 3/4"   | 7/8"   | 7/8"   | 5/8"   | 3/4"          | 7/8"   | 7/8"    | 7/8"   | 7/8"   | 7/8"                     | 7/8"   |  |  |
| Liquid line (in)   | 1/2"                         | 5/8"   | 5/8"   | 5/8"   | 1/2"   | 5/8"          | 5/8"   | 5/8"    | 5/8"   | 5/8"   | 5/8"                     | 5/8"   |  |  |
| Water In - ID  | I-I/8"                       | 1-3/8" | 1-3/8" | 1-3/8" | 1-1/8" | 1-3/8"        | 1-3/8" | 1-3/8"  | 1-3/8" | 1-3/8" | 1-3/8"                   | 1-3/8" |  |  |
| Water Out - OD   | 1-1/8"                       | 1-3/8" | 1-3/8" | 1-3/8" | 1-1/8" | I-3/8"        | 1-3/8" | 7-3/8"  | 1-3/8" | 1-3/8" | 1-3/8"                   | 1-3/8" |  |  |
| Humid. drain - OD  | 25                           | 25     | 25     | 25     | 25     | <b>/</b> 25 / | 25     | 25      | 25     | 25     | 25                       | 25     |  |  |
| Hum. supply - BSP  | 1/2"                         | 1/2"   | 1/2"   | 1/2"   | 1/2"/  | 1/2"          | 1/2"   | \ 1/2"\ | 1/2"   | 1/2"   | 1/2"                     | 1/2"   |  |  |
| Unit Weight - kg   |                              |        |        |        |        |               |        | \ \     |        | ^      |                          |        |  |  |
| Air cooled   | 296                          | 299    | 325    | 328    | 512    | 516           | 55 I   | 570     | 577    | 815    | 843                      | 853    |  |  |
| Water cooled   | 304                          | 307    | 335    | 339    | 537    | 543           | 580    | 599     | 609    | 854    | 882                      | 898    |  |  |
| Unit Dimensions -  | mm                           |        |        |        |        |               |        |         |        |        |                          |        |  |  |
| Width  | 850                          | 850    | 850    | 850    | 7,700  | 1,700         | 1,700  | 1,700   | J,700  | 2,550  | 2,550                    | 2,550  |  |  |
| Depth  | 850                          | 850/   | 850    | 850    | 850    | 850           | 850    | 850/    | 850    | 850    | 850                      | 850    |  |  |
| Height   | 1,950                        | 1,950  | 1,950  | 1,950  | 1,950  | 1,950         | 1,950  | 1,950   | 1,950  | 1,950  | 1,950                    | 1,950  |  |  |
|  |                              |        | A      |        |        |               | / /    | >       |        |        |                          |        |  |  |

<sup>(1)</sup> Gross capacity based on 45°C saturated condensing temperature 25Pa ESP, 0m a.s.l. For net capacities, deduct total fan input power. Unit heat rejection is approx. 1.22 x total cooling capacity. Refer Unit Selection program for specific input conditions

NOTES:



<sup>(2)</sup> Sound pressure level in dBA (re: 2 x 10 -5Pa) at 1.5m high and 2m in front, free field; casing radiated

<sup>(3)</sup> Matchups are designed to provide reliable operation over a wide ambient range. Avoid oversizing the condenser, as unstable winter operation may result. The selections should always be verified based on specific performances and different operating conditions.

Refer to the Unit Selection Program or contact Technical Support. Refer Condenser Technical Data manual for complete data.

<sup>(4)</sup> Standard pressure water regulating valve (WRV) 1000 kPa. Optional high pressure WRV (2400 kPa) available

<sup>(5)</sup> Nominal flow & pressure drop figures are for total unit. Based upon 22°CDB/50%RH, 30°C EWT & 35.5°C LWT

<sup>(6)</sup> FLA includes air cooled condensers

<sup>(7)</sup> Refrigerant/Condenser water connection sizes are per circuit

| PeX xxx D                                 | ucted   | Units               |        |          |          |         |                |         | Air       | & Wa     | iter C                 | ooled   | - R22     |
|---|---|---------------------|--------|----------|----------|---------|----------------|---------|-----------|----------|------------------------|---------|-----------|
| Model Size                                |   | 120                 | 125    | 130      | 135      | 240     | 245            | 250     | 260       | 270      | 380                    |         | 3100      |
| Rated Unit I                              | Perfor  |                     |        |          |          |         |                |         |           | _,,      |                        | 0.20    |           |
| 24°C DB, 17.                              |   |                     |        |          |          |         |                |         |           |          |                        |         |           |
| Total                                     |   | 19.4                | 22.5   | 30.8     | 34.7     | 39.1    | 45.6           | 51.9    | 62.1      | 71.8     | 77.5                   | 92.8    | 104.8     |
| Sensible                                  |   | 19.2                | 22.3   | 27.3     | 29.0     | 38.8    | 45.3           | 47.7    | 54.6      | 59.9     | 71.5                   | 81.9    | 86.9      |
| 24°C DB, 16.                              | 4°C WE  | 3, 45% l            | RH     |          |          |         |                |         |           |          |                        |         |           |
| Total                                     |   | 19.6                | 22.8   | 29.4     | 34.4     | 39.8    | 46.5           | 50.9    | 60.7      | 69.7     | 76.2                   | 90.1    | 103.3     |
| Sensible                                  |   | 19.5                | 22.6   | 29.0     | 31.2     | 39.5    | 46.2           | 50.5    | 58.5      | 63.8     | 75.6                   | 87.5    | 93.2      |
| 22°C DB, 15.                              | 5°C WE  | 3, <b>50</b> % l    | RH     |          |          |         |                |         |           |          |                        |         |           |
| Total                                     |   | 19.2                | 22.5   | 29.4     | 33.2     | 38.8    | 45.5           | 51.5    | 59.2      | 68.6     | 77.0                   | 88.6    | 100.0     |
| Sensible                                  |   | 19.1                | 22.3   | 26.9     | 28.6     | 38.5    | 45.2           | 48. I   | 53.6      | 59.0     | 72.I                   | 80.5    | 85.6      |
| 22°C DB, 14.                              | 7°C WE  | 3, 45% l            | RH     |          |          |         |                |         |           |          |                        |         |           |
| Total                                     |   | 19.2                | 22.8   | 28.2     | 32.6     | 39.0    | 45.3           | 50.4    | 56.7      | 66.3     | 75.3                   | 84.9    | 98.1      |
| Sensible                                  |   | 19.1                | 22.6   | 28.0     | 30.3     | 38.7    | 45.0           | 50.0    | 56.3      | 62.I     | 74.7                   | 84.2    | 90.7      |
| Fan Section                               | - Forw  | ard cu              | rved c | entrifu  | ıσal far | self-1  | ensior         | ning he | alt driv  | e IP5    | 5 moto                 | r       |           |
| Airflow - I/s                             | - 1 O1 W  | 1,800               | 2,150  | 2,150    | 2,150    | 3,550   | 4,200          | 4,200   | 4,200     | 4,200    | 6,350                  | 6,350   | 6,350     |
| Sound Level (2)                           |   | 48.9                | 51.2   | 51.4     | 51.5     | 52.4    | 53.1           | 53.3    | 53.7      | 53.9     | 55.5                   | 55.7    | 55.9      |
| Fan motor kW                              | - ea  | 2.2                 | 2.2    | 2.2      | 2.2      | 2.2     | 2.2            | 2.2     | 2.2       | 2.2      | 2.2/                   | 2.2     | 2.2       |
| No. of fans/mo                            |   | -:-<br>I            | <br>   | <br>     | <br>     | 2       | 2              | 2       | 2         | 2        | 3                      | 3       | 3         |
|   |   | -                   | -      | -        |          |         | _              |         |           | l - ,    | /                      |         | •         |
| Evaporator 2                              |   | 0.95                | 0.95   | 0.95     | 0.95     | 2.07    | 2.07           | 2.07    | 2.07      | 2.07     | 3.02                   | 3.02    | 3.02      |
| Face Area - m <sup>2</sup><br>No. of rows |   | 2                   | 0.73   | 3        | 4        | 2.07    | 2.07           | 2.07    | 3         | 4/       | 2                      | 3.02    | 3.02<br>4 |
| Fin series - FPI                          |   | 14                  | 14     | 14       | / 11     | 14      | 14             | 14      | .14       |          | 14                     | 3<br>14 | 1<br>     |
| Face velocity -                           | m/s   | 1.90                | 2.28   | 2.28     | 1        | 1.71    | 2.03           | 2.03/   | 2.03      | 2.03     | 2.11                   | 2.11    | 2.11      |
| •   |   |                     |        |          |          | 1.71    | 2.03           | 2.03    | 2.03      | 2.03     | 2,11                   | 2,11    | 2.11      |
| Compressor                                | •   | eland (             | Compl  | iant So  |          |         | 12/            | /       |           |          |                        |         |           |
| No. of compre                             |   | 1                   | 1      | 1        | 1        | 2       | 2 /            | 2/      | 2         | 2        | 3                      | 3       | 3         |
| Unit cooling sto                          | . /   | 2                   | 2      | \2       | 2        | 2       | 2              | / /     | 2         | 2        | 3                      | 3       | 3         |
| Safety controls                           | / <   |                     | . )    | nual res | •        |         |                |         | out/in (a | uto rese | et) 1 <del>4</del> 0/4 | 120 KPa |           |
| Humidifier -                              | _   | $\overline{}$       |        |          |          |         | _              |         |           |          |                        |         |           |
| Capacity - kg/h                           |   | 4.5                 | /4.5   | 4.5      | 4.5      | 5/      | 5              | 7.5     | 7.5       | 7.5      | 10                     | 10      | 10        |
| Input power - I                           | <w `<="" td=""><td>3.3</td><td>3.3</td><td>3.3</td><td>3.3</td><td>3.8</td><td>3.8</td><td>5.6</td><td>5.6</td><td>5.6</td><td>7.5</td><td>7.5</td><td>7.5</td></w> | 3.3                 | 3.3    | 3.3      | 3.3      | 3.8     | 3.8            | 5.6     | 5.6       | 5.6      | 7.5                    | 7.5     | 7.5       |
| Setting - amps                            |   | 9                   | 9      | 9        | 9        | 6       | 6              | 9       | 9         | 9        | 12                     | 12      | 12        |
| Heaters - Si                              | ngle st   | age fin             | ned tu | bular e  | electri  | elem    | ent            |         |           |          |                        |         |           |
| Capacity - kW                             |   | 6                   | 6      | 6        | 6        | 9       | 9              | 9       | 9         | 9        | 9                      | 9       | 9         |
| Filter - Dry                              | media   | dispos              | able G | 4 perfo  | orman    | ce to A | <b>AS</b> 1324 | ļ       |           |          |                        |         |           |
| Size - mm                                 |   |                     |        | -        |          | 790     | x 790 x        | 100     |           |          |                        |         |           |
| Qty                                       |   | 1                   | 1      | I        | 1        | 2       | 2              | 2       | 2         | 2        | 3                      | 3       | 3         |
| Air Cooled                                | Conde   | nsers <sup>(3</sup> | 3)     |          |          |         |                |         |           |          |                        |         |           |
| 30°C                                      | Single  | LS20                | LS25   | LS40     | LS40     | LS20×2  | LS25×2         | LS25×2  | LS40×2    | LS40×2   | LS25×3                 | LS40×3  | LS40×3    |
| •   | Dual  | -                   | -      | -        | -        | LD50    | LD60           | LD70    | -         | -        | -                      | -       | -         |
| 35°C                                      | Single  | LS25                | LS25   | LS50     | LS50     | LS25×2  | LS25×2         | LS40×2  | LS50×2    | LS50×2   | LS40×3                 | LS50x3  | LS50×3    |
|   | Dual  | -                   | -      | -        | -        | LD60    | LD70           | -       | -         | -        | -                      | -       | -         |
| 40°C                                      | Single  | LS40                | LS50   | LS60     | LS70     | LS40×2  | LS50×2         | LS60×2  | LS70×2    | LS70×2   | LS60×3                 | LS70×3  | LS70×3    |
|   | Dual  | -                   | -      | -        | -        | LD70    | -              | -       | -         | -        | -                      | -       | -         |
|   |   |                     |        |          |          |         |                |         |           |          |                        |         |           |

2 - 3

| PeX xxx Ducted       | Units   |                |          |        |         |               |        | Air     | & Wa   | iter C            | ooled  | - R22  |
|----------------------|---------|----------------|----------|--------|---------|---------------|--------|---------|--------|-------------------|--------|--------|
| Model Size           | 120     | 125            | 130      | 135    | 240     | 245           | 250    | 260     | 270    | 380               | 390    | 3100   |
| Water Cooled Cor     | ndense  | r - 316        | SS Bra   | azed p | late he | eat exc       | hange  | r - 2 w | ay WF  | RV <sup>(4)</sup> |        |        |
| Water flow - I/s (5) | 1.0     | 1.2            | 1.6      | 1.8    | 2.0     | 2.3           | 2.7    | 3.1     | 3.6    | 4.0               | 4.7    | 5.3    |
| Valve size           | 1"      | 1-1/4"         | 1-1/4"   | 1-1/4" | Ι"      | 1-1/4"        | 1-1/4" | 1-1/4"  | 1-1/4" | 1-1/4"            | 1-1/4" | 1-1/4" |
| Press drop - kPa     | 45      | 32             | 54       | 67     | 46      | 32            | 38     | 55      | 64     | 38                | 55     | 67     |
| Full Load Current    | - 380/4 | 415 <b>V</b> o | lts, 3 p | hase+  | N+E, !  | 50 Hz         | Supply | ,       |        |                   |        |        |
| Air cooled (6)       | 26.3    | 28.3           | 37.0     | 38.9   | 38.6    | 42.6          | 57.8   | 59.6    | 63.4   | 81.8              | 84.5   | 90.2   |
| Water Cooled         | 23.6    | 25.6           | 30.9     | 32.8   | 35.2    | 39.2          | 51.0   | 52.8    | 56.6   | 75.0              | 77.7   | 83.4   |
| Unit Connections     | (7)     |                |          |        |         |               |        |         |        |                   |        |        |
| Discharge line (out) | 5/8"    | 3/4"           | 7/8"     | 7/8"   | 5/8"    | 3/4"          | 7/8"   | 7/8"    | 7/8"   | 7/8"              | 7/8"   | 7/8"   |
| Liquid line (in)     | 1/2"    | 5/8"           | 5/8"     | 5/8"   | 1/2"    | 5/8"          | 5/8"   | 5/8"    | 5/8"   | 5/8"              | 5/8"   | 5/8"   |
| Water In - ID        | 1-1/8"  | 1-3/8"         | 1-3/8"   | 1-3/8" | 1-1/8"  | 1-3/8"        | 1-3/8" | 1-3/8"  | 1-3/8" | 1-3/8"            | 1-3/8" | 1-3/8" |
| Water Out - OD       | 1-1/8"  | 1-3/8"         | 1-3/8"   | 1-3/8" | 1-1/8"  | 1-3/8"        | 1-3/8" | 1-3/8"  | 1-3/8" | 1-3/8"            | 1-3/8" | I-3/8" |
| Humid. drain - OD    | 25      | 25             | 25       | 25     | 25      | <b>/</b> 25 / | 25     | 25      | 25     | 25                | 25     | 25     |
| Hum. supply - BSP    | 1/2"    | 1/2"           | 1/2"     | 1/2"   | 1/2"/   | 1/2"          | 1/2"   | \ I/2"\ | 1/2"   | 1/2"              | 1/2"   | 1/2"   |
| Unit Weight - kg     |         |                |          |        |         |               |        | \ \     |        | $\wedge$          |        |        |
| Air cooled           | 283     | 286            | 312      | 315    | 490     | 494           | 529    | 548     | 555    | 78 I              | 809    | 819    |
| Water cooled         | 291     | 294            | 322      | 326    | 515     | 521           | 558    | 577     | 587    | 820               | 848    | 862    |
| Unit Dimensions -    | mm      |                |          |        |         |               |        |         |        |                   |        |        |
| Width                | 850     | 850            | 850      | 850    | 1,700   | 1,700         | 1,700  | 1,700   | J,700  | 2,550             | 2,550  | 2,550  |
| Depth                | 850     | 850/           | 850      | 850    | 850     | 850           | 850    | 850     | 850    | 850               | 850    | 850    |
| Height               | 1,950   | 1,950          | J,950    | 1,950  | 1,950   | 1,950         | 1,950  | 1,950   | 1,950  | 1,950             | 1,950  | 1,950  |
| NOTES:               |         |                | ٧        |        |         |               |        | >       |        |                   |        |        |

<sup>(1)</sup> Gross capacity based on 45°C saturated condensing temperature 100Fa ESP, 0m a.s.l. For net capacities, deduct total fan input power. Unit heat rejection is approx. 1.22 x total cooling capacity. Refer Unit Selection program for specific input conditions



<sup>(2)</sup> Sound pressure level in dBA (re: 2 x 10<sup>-5</sup>Pa) at 1.5m high and 2m in front, free field; casing radiated

<sup>(3)</sup> Matchups are designed to provide reliable operation over a wide ambient range. Avoid oversizing the condenser, as unstable winter operation may result. The selections should always be verified based on specific performances and different operating conditions.

Refer to the Unit Selection Program or contact Technical Support. Refer Condenser Technical Data manual for complete data.

<sup>(4)</sup> Standard pressure water regulating valve (WRV) 1000 kPa. Optional high pressure WRV (2400 kPa) available

<sup>(5)</sup> Nominal flow & pressure drop figures are for total unit. Based upon 22°CDB/50%RH, 30°C EWT & 35.5°C LWT

<sup>(6)</sup> FLA includes air cooled condensers

<sup>(7)</sup> Refrigerant/Condenser water connection sizes are per circuit

| PeX xxx Flo                | or and   |         |          |           |               | _             |         |               |           | Wate           |           |         |        |
|----------------------------|----------|---------|----------|-----------|---------------|---------------|---------|---------------|-----------|----------------|-----------|---------|--------|
| Model Size                 |          | 120     | 125      | 130       | 135           | 240           | 245     | 250           | 260       | 270            | 380       | 390     | 3100   |
| Rated Unit P               |          |         |          | 1)        |               |               |         |               |           |                |           |         |        |
| 24°C DB, 17.1              | °C WB    |         |          |           |               |               |         |               |           |                |           |         |        |
| Total                      |          | 20.5    | 23.3     | 32.3      | 37.2          | 42.0          | 46.9    | 53.9          | 65.0      | 74.6           | 80.5      | 97.3    | 111.8  |
| Sensible                   |          | 19.9    | 23.2     | 27.6      | 29.7          | 40.3          | 46.6    | 49.6          | 55. I     | 59.2           | 74.2      | 82.8    | 88.9   |
| 24°C DB, 16.4              | °C WB    | , 45% I | RH       |           |               |               |         |               |           |                |           |         |        |
| Total                      |          | 20.6    | 23.4     | 31.2      | 36.2          | 41.8          | 47.6    | 52.3          | 62.3      | 73.I           | 78.4      | 93.5    | 109.3  |
| Sensible                   |          | 20.4    | 23.3     | 29.4      | 31.6          | 41.5          | 47.2    | 51.9          | 58.4      | 63.I           | 77.8      | 87.8    | 94.7   |
| 22°C DB, 15.5              | °C WB    | , 50% I | RH       |           |               |               |         |               |           |                |           |         |        |
| Total                      |          | 20.1    | 23.2     | 30.4      | 35.5          | 40. I         | 46.9    | 52.8          | 61.7      | 70.8           | 78.8      | 92.I    | 106.3  |
| Sensible                   |          | 19.9    | 23.0     | 27.0      | 29.3          | 39.8          | 46.6    | 49.7          | 54.0      | 58.2           | 74.4      | 81.1    | 87.4   |
| 22°C DB, 14.7              | °C WB    | , 45% I | RH       |           |               |               |         |               |           |                |           |         |        |
| Total                      |          | 20.1    | 23.3     | 29.3      | 34.5          | 40.9          | 46.7    | 51.8          | 59.5      | ≤ <b>69.</b> l | 77.7      | 88.8    | 103.6  |
| Sensible                   |          | 19.9    | 23.1     | 28.4      | 30.8          | 40.6          | 46.3    | 5/1.4         | 56.9      | 61.3           | 77.2      | 85.4    | 92.2   |
| Fan Section -              | - Forwa  | ard cu  | rved c   | entrifu   | ıgal far      | ı. self-ı     | tensio  | ning be       | elt driv  | e. IP5         | 5 moto    | or      |        |
| Airflow - I/s              |          | 1,800   | 2,250    | 2,250     | 2,250         | 3,550         | 4,400   | 4,400         | 4,400     | 4,400          | 6,650     | 6,650   | 6,650  |
| Sound Level (2)            | Floor    | 43.4    | 45.7     | 45.7      | 45.7          | 47.3/         | 49.0    | 49.0          | 49.8      | 50.1           | 50.7      | 51.2    | 51.4   |
| 204114 2070.               | Room     | 48.9    | 51.2     | 51.4      | 51.5          | 52.4          | 53.1    | 53.3          | 53.7      | 53.9           | 55.5      | 55.7    | 55.9   |
| Fan motor kW               |          | 2.2     | 2.2      | 2.2       | 2.2           | 2.2/          | 2.2     | 2.2           | 2.2       | 2.2            | 2.2       | /2.2    | 2.2    |
| No. of fans/mot            |          | <br>I   | <br>     | <br>      | <br>          | 2.2           | 2       | 2.2           | 2         | 2.2            | 3 /       | 3       | 3      |
|                            |          | -       | -        | •         |               | · .           | - \     | \ \           |           |                |           | J       | J      |
| Evaporator C               | -011 - C |         |          | _         | $\overline{}$ | $\overline{}$ |         | $\rightarrow$ |           |                | 2.02      | 2.02    | 2.02   |
| Face Area - m <sup>2</sup> |          | 0.95    | 0.95     | 0.95      | 0.95          | 2.07          | 2.07    | 2.07          | 2.07      | 2.07           | 3.02      | 3.02    | 3.02   |
| No. of rows                |          | 2       | 2        | 3 '       | 4             | 2             | 1       | 2             | 3         | 4              | 2         | 3       | 4      |
| Fin series - FPI           |          | 14      | 14       | 14        | 711/          | 14            | 14      | 14 \          | 14        | 11             | 14        | 14      | 11     |
| Face velocity - n          |          | 1.90    | 2.38     | 2.38      | 2.38          | 1.71          | 2.12    | 2.12          | 2.12      | 2.12           | 2.20      | 2.20    | 2.20   |
| Compressor                 |          | eland ( | Compl    | iant Sc   | ròll          |               |         |               |           |                |           |         |        |
| No. of Compres             |          |         | I        | \1\       | ΣI            |               | 2       | _/2           | 2         | 2              | 3         | 3       | 3      |
| Unit cooling ste           | . /      | 2       | 2        | 7 /       | 2             | 2             | 2       | 2             | 2         | 2              | 3         | 3       | 3      |
| Safety controls            |          | HP cut  | out (mai | nual rese | et) 2,800     | 0 kPa \       |         | LP cuto       | out/in (a | uto rese       | et) 140/4 | 120 kPa |        |
| Humidifier -               | Immei    | rsed el | ectro    | le stea   | m gen         | erato         | r humi  | difier        |           |                |           |         |        |
| Capacity - kg/hr           |          | 4.5     | 4.5      | 4.5       | 4.5           | 5             | 5       | 7.5           | 7.5       | 7.5            | 10        | 10      | 10     |
| Input power - k            | W        | 3.3     | 3.3      | 3.3       | 3.3           | 3.8           | 3.8     | 5.6           | 5.6       | 5.6            | 7.5       | 7.5     | 7.5    |
| Setting - amps             |          | 9       | 9        | 9         | 9             | 6             | 6       | 9             | 9         | 9              | 12        | 12      | 12     |
| Heaters - Sin              | ale sta  | ge fin  | ned tu   | hular e   | electri       | r elem        | ent     |               |           |                |           |         |        |
| Capacity - kW              | igic sca | 6       | 6        | bulai (   | 6             | 9             | 9       | 9             | 9         | 9              | 9         | 9       | 9      |
| . ,                        |          |         |          |           |               |               |         |               | ,         | •              | •         | ,       | ,      |
| Filter - Dry n             | nedia c  | uspos   | able G   | 4 perio   | orman         |               |         |               |           |                |           |         |        |
| Size - mm                  |          |         |          |           |               |               | × 790 × |               | 2         | 2              | 2         | 2       | _      |
| Qty                        |          | 1       | . 1      | I         | I             | 2             | 2       | 2             | 2         | 2              | 3         | 3       | 3      |
| Air Cooled C               |          | sers (3 | ")       |           |               |               |         |               |           |                |           |         |        |
| 30°C                       | Single   | LS25    | LS25     | LS40      | LS50          | LS25×2        | LS25x2  | LS40x2        | LS40x2    | LS50x2         | LS40x3    | LS40x3  | LS50×3 |
|                            | Dual     | -       | -        | -         | -             | LD50          | LD60    | LD70          | -         | -              | -         | -       | -      |
| 35°C                       | Single   | LS40    | LS40     | LS50      | LS60          | LS40x2        | LS40x2  | LS50x2        | LS50x2    | LS60x2         | LS50x3    | LS50x3  | LS60×3 |
|                            | Dual     | -       | -        | -         | -             | LD70          | -       | -             | -         | -              | -         | -       | -      |
| 40°C                       | Single   | LS50    | LS60     | LS70      | LS70          | LS50×2        | LS60x2  | LS70x2        | LS70×2    | LS70×2         | LS70x3    | LS70×3  | LS70x3 |
|                            | Dual     | -       | -        | -         | -             | -             | -       | -             | -         | -              | -         | -       | -      |
|                            |          |         |          |           |               |               |         |               |           |                |           |         |        |

| PeX xxx Floor an   | PeX xxx Floor and Room Units |         |        |        |        |         |         |                   |        | Air & Water Cooled - R407C |        |        |  |  |
|--|------------------------------|---------|--------|--------|--------|---------|---------|-------------------|--------|----------------------------|--------|--------|--|--|
| Model Size   | 120                          | 125     | 130    | 135    | 240    | 245     | 250     | 260               | 270    | 380                        | 390    | 3100   |  |  |
| Water Cooled Cor   | dense                        | r - 316 | SS Bra | zed pl | ate he | at excl | hangei  | r - 2 wa          | ay WR  | <b>V</b> <sup>(4)</sup>    |        |        |  |  |
| Water flow - I/s (5)   | 1.1                          | 1.2     | 1.6    | 1.8    | 2.1    | 2.4     | 2.8     | 3.2               | 3.7    | 4.2                        | 4.7    | 5.6    |  |  |
| Valve size   | 1"                           | 1-1/4"  | 1-1/4" | 1-1/4" | Ι"     | 1-1/4"  | 1-1/4"  | 1-1/4"            | 1-1/4" | 1-1/4"                     | 1-1/4" | 1-1/4" |  |  |
| Press drop - kPa   | 43                           | 31      | 49     | 68     | 44     | 31      | 40      | 49                | 68     | 40                         | 49     | 68     |  |  |
| Full Load Current - 380/415 Volts, 3 phase+N+E, 50 Hz Supply |                              |         |        |        |        |         |         |                   |        |                            |        |        |  |  |
| Air cooled (6)   | 29.7                         | 31.7    | 37.0   | 42.3   | 42.0   | 46.0    | 57.8    | 59.6              | 66.8   | 81.8                       | 84.5   | 93.6   |  |  |
| Water Cooled   | 23.6                         | 25.6    | 30.9   | 32.8   | 35.2   | 39.2    | 51.0    | 52.8              | 56.6   | 75.0                       | 77.7   | 83.4   |  |  |
| Unit Connections   | 7)                           |         |        |        |        |         |         |                   |        |                            |        |        |  |  |
| Discharge line (out)   | 5/8"                         | 3/4"    | 7/8"   | 7/8"   | 5/8"   | 3/4"    | 7/8"    | 7/8"              | 7/8"   | 7/8"                       | 7/8"   | 7/8"   |  |  |
| Liquid line (in)   | 1/2"                         | 5/8"    | 5/8"   | 5/8"   | 1/2"   | 5/8"    | 5/8"    | 5/8"              | 5/8"   | 5/8"                       | 5/8"   | 5/8"   |  |  |
| Water In - ID  | 1-1/8"                       | 1-3/8"  | I-3/8" | 1-3/8" | 1-1/8" | 1-3/8"  | 1-3/8"  | <del>-</del> 3/8" | 1-3/8" | 1-3/8"                     | I-3/8" | 1-3/8" |  |  |
| Water Out - OD   | 1-1/8"                       | 1-3/8"  | I-3/8" | 1-3/8" | 1-1/8" | 1-3/8"  | 1-3/8"  | I-3/8"            | 1-3/8" | 1-3/8"                     | I-3/8" | 1-3/8" |  |  |
| Humid. drain - OD  | 25                           | 25      | 25     | 25     | 25     | 25      | 25      | 25                | 25     | 25                         | 25     | 25     |  |  |
| Hum. supply - BSP  | 1/2"                         | 1/2"    | 1/2"   | 1/2"   | V2"    | 1/2" \  | 1/2"    | 1/2"              | 1/2"   | 1/2"                       | 1/2"   | 1/2"   |  |  |
| Unit Weight - kg   |                              |         |        |        |        |         |         |                   |        |                            |        |        |  |  |
| Air cooled   | 296                          | 299     | 325    | 328    | 512    | \516    | \55\    | 570               | 577/   | 815                        | 843    | 853    |  |  |
| Water cooled   | 307                          | 308     | 338    | 342    | 542    | 545     | 583     | 604               | 614    | 858                        | 890    | 904    |  |  |
| Unit Dimensions -  | mm                           |         |        |        |        |         |         |                   | _/     |                            |        |        |  |  |
| Width  | 850                          | 850     | 850    | 850    | 1,700  | 00٫۲٫۱  | \ I,700 | 1,700             | 1,700  | 2,550                      | 2,550  | 2,550  |  |  |
| Depth  | 850                          | 850     | 850    | 850    | 850    | 850     | 850     | 850               | 850    | 850                        | 850    | 850    |  |  |
| Height   | 1,950                        | 1,950   | 1,950  | 1,950  | 1,950  | 1,950   | 1,950   | 1,950             | 1,950  | 1,950                      | 1,950  | 1,950  |  |  |

#### NOTES:

- (1) Gross capacity based on 45°C mid-point condensing temperature, 25Pa ESP, 0m a.s.l. For net capacities, deduct total fan input power. Unit heat rejection is approx. 1.25 x total cooling capacity. Refer Unit Selection program for specific input conditions
- (2) Sound pressure level in dBA (re: 2 x 10<sup>-5</sup>Pa) at 1.5m high and 2m in front, free field; casing radiated
- (3) Matchups are designed to provide reliable operation over a wide ambient range. Avoid oversizing the condenser, as unstable winter operation may result. The selections should always be verified based on specific performances and different operating conditions.

  Refer to the Unit Selection Program or contact Technical Support. Refer Condenser Technical Data manual for complete data.
- (4) Standard pressure water regulating valve (WRV) 1000 kPa. Optional high pressure WRV (2400 kPa) available
- (5) Nominal flow & pressure drop figures are for total unit. Based upon 22°CDB/50%RH, 30°C EWT & 35.5°C LWT
- (6) FLA includes air cooled condensers
- (7) Refrigerant/Condenser water connection sizes are per circuit



| PeX xxx Du                 | ıcted    | Units               |          |            |            |           |         |         | Air & `   | Wate     | r <b>Co</b> ol | led - R | 407C   |
|----------------------------|----------|---------------------|----------|------------|------------|-----------|---------|---------|-----------|----------|----------------|---------|--------|
| Model Size                 | -        | 120                 | 125      | 130        | 135        | 240       | 245     | 250     | 260       | 270      | 380            |         | 3100   |
| Rated Unit F               | Perfori  | mance               | - kW (   | )          |            |           |         |         |           |          |                |         |        |
| 24°C DB, 17.1              |          |                     |          |            |            |           |         |         |           |          |                |         |        |
| Total                      |          | 20.5                | 23.0     | 32.3       | 37.2       | 42.0      | 47.5    | 53.1    | 64.6      | 74.4     | 79.3           | 96.9    | 111.6  |
| Sensible                   |          | 19.9                | 22.7     | 27.1       | 29.2       | 40.3      | 46.0    | 48.2    | 53.8      | 57.9     | 72.2           | 80.8    | 87. I  |
| 24°C DB, 16.4              | 1°C WI   | B, 45% I            | RH       |            |            |           |         |         |           |          |                |         |        |
| Total                      |          | 20.6                | 23.4     | 31.1       | 36.2       | 41.8      | 47.0    | 51.5    | 62.7      | 72.0     | 77.2           | 93.8    | 108.1  |
| Sensible                   |          | 20.4                | 23.2     | 28.7       | 30.9       | 41.5      | 46.6    | 51.1    | 57.2      | 61.3     | 76.6           | 86.0    | 92.2   |
| 22°C DB, 15.5              | oc Wi    | B, 50% I            | RH       |            |            |           |         |         |           |          |                |         |        |
| Total                      |          | 20.1                | 22.7     | 30.4       | 35.0       | 40. I     | 45.8    | 52.8    | 60.7      | 69.9     | 78.9           | 91.2    | 104.8  |
| Sensible                   |          | 19.9                | 22.6     | 26.5       | 28.5       | 39.8      | 45.4    | 48.7    | 52.5      | 56.6     | 72.9           | 79.0    | 85. I  |
| 22°C DB, 14.7              | O'C WI   | B, 45% I            | RH       |            |            |           |         |         |           |          |                |         |        |
| Total                      |          | 20.1                | 23.0     | 29.3       | 34.0       | 40.9      | 46.3    | 51.3    | 59.6      | ∠ 68.7   | 76.9           | 89.0    | 102.8  |
| Sensible                   |          | 19.9                | 22.8     | 27.8       | 30.0       | 40.6      | 45.9    | 5/1.0   | 55.7      | 59.9     | 76.3           | 83.5    | 89.9   |
| Fan Section                | - Forw   | ard cu              | rved ce  | entrifu    | ıgal far   | ı, self-t | ension  | ning be | elt driv  | e, IP5!  | 5 moto         | or      |        |
| Airflow - I/s              |          | 1,800               | 2,150    | 2,150      | 2,150      | 3,550     | 4,200   | 4,200   | 4,200     | 4,200    | 6,350          | 6,350   | 6,350  |
| Sound Level (2)            |          | 48.9                | 51.2     | 51.4       | 51.5       | 52.4/     | 53.J    | 53.3    | 53.7      | 53.9     | 55.5           | 55.7    | 55.9   |
| Fan motor kW               | - ea     | 2.2                 | 2.2      | 2.2        | 2.2        | 2.2       | 2.2     | 2.2     | 2.2       | 2.2      | 2.2            | 2.2     | 2.2    |
| No. of fans/mot            | ors      | I                   | 1        | I          | 1          | < 2 /     | 2\      | 2       | 2         | 2        | 3              | / 3     | 3      |
| Evaporator (               | Coil - ( | Copper              | tubes    | with r     | ifled b    | ore, lo   | uvred   | alumi   | nium f    | ins      |                |         |        |
| Face Area - m <sup>2</sup> |          | 0.95                | 0.95     | 0.95 /     | 0.95       | 2.07      | 2.07    | 2.07    | 2.07      | 2.07     | 3.02           | 3.02    | 3.02   |
| No. of rows                |          | 2                   | 2        | 3 \        | 4          | \2\       | 2       | 2       | 3         | 4        | 2              | 3       | 4      |
| Fin series - FPI           |          | 14                  | 14 _     | 14         | \ \ullet(  | 14        | 14      | 14      | \ 14      | П        | 14             | 14      | 11     |
| Face velocity - r          | m/s      | 1.90                | 2.28     | 2,28       | 2.28       | 1.71      | 2.03    | 2.03    | 2,03      | 2.03     | 2.11           | 2.11    | 2.11   |
| Compressor                 | - Cop    | eland (             | Compli   | ant So     | roll       |           |         |         |           |          |                |         |        |
| No. of compres             | sors     |                     | I        | 11/        | $\sqrt{V}$ | 2         | 2 )     | 2       | 2         | 2        | 3              | 3       | 3      |
| Unit cooling ste           | ps       | 2                   | 2        | \2\        | 2          | > 2       | 2       | /2      | 2         | 2        | 3              | 3       | 3      |
| Safety controls            |          | HP cut              | out (man | iual res   | et) 2,800  | ) kPa     |         | LP cuto | out/in (a | uto rese | t) 140/4       | 120 kPa |        |
| Humidifier -               | Imme     | rsed e              | lectrod  | e stea     | m gen      | erator    | humi    | difier  |           |          |                |         |        |
| Capacity - kg/hr           | . /      | 4.5                 | 4.5      | 4.5        | 4.5        | 5         | 5       | 7.5     | 7.5       | 7.5      | 10             | 10      | 10     |
| Input power - k            | W        | 3.3                 | 3.3      | 3.3        | 3.3        | 3.8       | 3.8     | 5.6     | 5.6       | 5.6      | 7.5            | 7.5     | 7.5    |
| Setting - amps             |          | 9                   | 9        | 9          | 9          | 6         | 6       | 9       | 9         | 9        | 12             | 12      | 12     |
| Heaters - Sir              | ngle st  | age fin             | ned tul  | oular e    | electric   | elem      | ent     |         |           |          |                |         |        |
| Capacity - kW              |          | 6                   | 6        | <u>_</u> 6 | 6          | 9         | 9       | 9       | 9         | 9        | 9              | 9       | 9      |
| Filter - Dry r             | nedia    | disposa             | able G   | perfo      | orman      | ce to A   | AS1324  | 1       |           |          |                |         |        |
| Size - mm                  |          |                     |          |            |            | 790       | x 790 x | 100     |           |          |                |         |        |
| Qty                        |          | I                   | I        | I          | I          | 2         | 2       | 2       | 2         | 2        | 3              | 3       | 3      |
| Air Cooled C               | Conde    | nsers <sup>(3</sup> | !)       |            |            |           |         |         |           |          |                |         |        |
| 30°C                       | Single   | LS25                | LS25     | LS40       | LS50       | LS25×2    | LS25×2  | LS40×2  | LS40×2    | LS50x2   | LS40×3         | LS40×3  | LS50×3 |
|                            | Dual     | -                   | -        | -          | -          | LD50      | LD60    | LD70    | -         | -        | -              | -       | -      |
| 35°C                       | Single   | LS40                | LS40     | LS50       | LS60       | LS40×2    | LS40x2  | LS50×2  | LS50x2    | LS60x2   | LS50×3         | LS50x3  | LS60×3 |
|                            | Dual     | -                   | -        | -          | -          | LD70      | -       | -       | -         | -        | -              | -       | -      |
| 40°C                       | Single   | LS50                | LS60     | LS70       | LS70       | LS50×2    | LS60×2  | LS70×2  | LS70×2    | LS70×2   | LS70×3         | LS70×3  | LS70×3 |
|                            | Dual     | -                   | -        | -          | -          | -         | -       | -       | -         | -        | -              | -       | -      |
|                            |          |                     |          |            |            |           |         |         |           |          |                |         |        |

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| PeX xxx Ducted U   | Jnits  |        |        |        |        |        |         | Air &  | Wate         | r Cool       | led - R | 407C   |
|--|--------|--------|--------|--------|--------|--------|---------|--------|--------------|--------------|---------|--------|
| Model Size   | 120    | 125    | 130    | 135    | 240    | 245    | 250     | 260    | 270          | 380          | 390     | 3100   |
| Water Cooled Condenser - 316SS Brazed plate heat exchanger - 2 way WRV (4) |        |        |        |        |        |        |         |        |              |              |         |        |
| Water flow - I/s (5)   | 1,1    | 1.2    | 1.6    | 1.8    | 2.1    | 2.4    | 2.8     | 3.2    | 3.7          | 4.2          | 4.7     | 5.5    |
| Valve size   | Ι"     | 1-1/4" | 1-1/4" | 1-1/4" | Ι"     | 1-1/4" | 1-1/4"  | 1-1/4" | 1-1/4"       | 1-1/4"       | 1-1/4"  | 1-1/4" |
| Press drop - kPa   | 43     | 31     | 49     | 67     | 44     | 31     | 39      | 49     | 67           | 39           | 49      | 67     |
| Full Load Current - 380/415 Volts, 3 phase+N+E, 50 Hz Supply               |        |        |        |        |        |        |         |        |              |              |         |        |
| Air cooled (6)   | 29.7   | 31.7   | 37.0   | 42.3   | 42.0   | 46.0   | 57.8    | 59.6   | 66.8         | 81.8         | 84.5    | 93.6   |
| Water Cooled   | 23.6   | 25.6   | 30.9   | 32.8   | 35.2   | 39.2   | 51.0    | 52.8   | 56.6         | 75.0         | 77.7    | 83.4   |
| Unit Connections (7  | 7)     |        |        |        |        |        |         |        |              |              |         |        |
| Discharge line (out)   | 5/8"   | 3/4"   | 7/8"   | 7/8"   | 5/8"   | 3/4"   | 7/8"    | 7/8"   | 7/8"         | 7/8"         | 7/8"    | 7/8"   |
| Liquid line (in)   | 1/2"   | 5/8"   | 5/8"   | 5/8"   | 1/2"   | 5/8"   | 5/8"    | 5/8"   | 5/8"         | 5/8"         | 5/8"    | 5/8"   |
| Water In - ID  | 1-1/8" | 1-3/8" | I-3/8" | 1-3/8" | 1-1/8" | 1-3/8" | 1-3/8"  | 3/8"   | 1-3/8"       | I-3/8"       | 1-3/8"  | I-3/8" |
| Water Out - OD   | 1-1/8" | 1-3/8" | I-3/8" | 1-3/8" | 1-1/8" | 1-3/8" | 1-3/8"  | 1-3/8" | 1-3/8"       | I-3/8"       | 1-3/8"  | 1-3/8" |
| Humid. drain - OD  | 25     | 25     | 25     | 25     | 25     | 25     | 25      | 25     | 25           | 25           | 25      | 25     |
| Hum. supply - BSP  | 1/2"   | 1/2"   | 1/2"   | 1/2"   | W2"    | ıλ2" \ | 1/2"    | 1/2"   | 1/2"         | 1/2"         | 1/2"    | 1/2"   |
| Unit Weight - kg   |        |        |        |        |        |        |         |        |              |              |         |        |
| Air cooled   | 283    | 286    | 312    | 315    | 490    | 494    | 529     | 548    | 555          | <b>7</b> 81  | 809     | 819    |
| Water cooled   | 294    | 295    | 325    | 329    | 520    | 523    | 561     | 582    | <b>-</b> 592 | <b>/</b> 824 | 856     | 870    |
| Unit Dimensions - I  | mm     |        |        |        |        |        |         |        | _/           |              |         |        |
| Width  | 850    | 850    | 850    | 850    | J,700  | 00٫۲٫۱ | \ I,700 | 1,700  | 1,700        | 2,550        | 2,550   | 2,550  |
| Depth  | 850    | 850    | 850    | 850    | 850    | 850    | 850     | 850    | 850          | 850          | 850     | 850    |
| Height   | 1,950  | 1,950  | 1,950  | 1,950  | 1,950  | 1,950  | 1,950   | 1,950  | 1,950        | 1,950        | 1,950   | 1,950  |

#### NOTES:

- (1) Gross capacity based on 45°C mid-point condensing temperature, 100Pa ESP, 0m a.s.l. For net capacities, deduct total fan input power.

  Unit heat rejection is approx. 1.25 x total cooling capacity. Refer Unit Selection program for specific input conditions
- (2) Sound pressure level in dBA (re: 2 x 10<sup>-5</sup>Pa) at 1.5m high and 2m in front, free field; casing radiated
- (3) Matchups are designed to provide reliable operation over a wide ambient range. Avoid oversizing the condenser, as unstable winter operation may result. The selections should always be verified based on specific performances and different operating conditions.

  Refer to the Unit Selection Program or contact Technical Support. Refer Condenser Technical Data manual for complete data.
- (4) Standard pressure water regulating valve (WRV) 1000 kPa. Optional high pressure WRV (2400 kPa) available
- (5) Nominal flow & pressure drop figures are for total unit. Based upon 22°CDB/50%RH, 30°C EWT & 35.5°C LWT
- (6) FLA includes air cooled condensers
- (7) Refrigerant/Condenser water connection sizes are per circuit



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# **Unit Controls**

#### Introduction

The CEMS100 is a microprocessor based controller specifically designed for the Liebert PeX range of process cooling units. It allows precise control of temperature and humidity conditions within a computer room or similar environment. The control features ISP technology (In-System-Programming), and an easy-to-use menu driven LCD graphics display offering unprecedented levels of control, monitoring and flexibility.

# Display

Large backlit  $240 \times 128$  dot matrix graphics display indicating:

- Unit number
- · Time and date
- Temperature and humidity values to I decimal point (actual & setpoint) and 4 hour history graph
- 'Dynamic' operating mode icons
- A-O-M (Auto-Off-Manual) override status
- · Battery charge level
- · User friendly HELP screens
- 3 levels of password protection Customer, Service & Factory

#### Control

• Temperature Setpoint

Return - 17 to 32  $^{\circ}$ C Supply - 10 to 16  $^{\circ}$ C

Humidity Setpoint

20 to 65 %RH

High Temperature Alarm

15 to 35 °C

Low Temperature Alarm

5 to 35 °C

High Humidity Alarm

30 to 80 %RH

• Low Humidity Alarm

10 to 70 %RH

# Control Type

- P-I-D & Dewpoint control strategies employed as standard
- Return or supply air control selection (for special applications)



CEMS I 00 LCD Display Panel

# **System Control**

Configurable unit setup parameters provide flexibility for varying applications:

- Unit identification number (01 99) an assignable address for unique unit display identification and high level communications
- Startup Delay (0 255 sec) for staged automatic restart following a mains power failure
- Cold Start Delay (0 255 sec) a low suction pressure switch bypass time delay to assist with compressor starts in cold weather
- Fan Run On (0 255 sec) evaporator fan run on timer to dissipate residual energy from electric heaters
- Sensor Calibration adjust temperature and humidity sensor readings to match independent sensors
- Remote Shutdown selectable digital input logic for unit on/off control management
- General Alarm selectable digital output logic for common alarm status
- Advanced Setup. A series of high level parameters are provided for optimal control of temperature and humidity and special applications. This includes the ability to configure the Variable or Tunable P-I-D settings.
- Modulating Output Control selection of 4 types of signals: 0-20mA, 4-20mA, 0-10VDC or PWM for each analogue output to manage different control devices
- Compressor Changeover balances compressor run times on multiple compressor units

# System Control (Continued)

- Re-heat mode supports modulating re-heat operation for close control of temperature and humidity in low load applications such as archive, pharmaceutical and test/laboratory rooms.
- DX Modulation supports modulating refrigeration control for close control of supply air temperature and humidity in MRI applications.

# Monitoring & Communications

- LinkUp® up to 40 units can be 'networked' together in up to 4 operational groups or zones for sequence changeover, standby duties and cascade facility, with single point access for alarm reporting and system connectivity.
- LinkUp-M®-expansion feature for LinkUp offering MODBUS RTU communications for BMS integration.
- IntelliSlot Web Card with Adapter transforms units into manageable nodes within a Network, NMS, and BMS system. Uses industry-standard open protocols.
- Local Override isolates CEMS100 controller from high and low level control for operator safety during routine maintenance and servicing.
- Graph Menu allows user to view return and supply temperature and humidity readings for previous 48 hours. Built-in zoom and pan functions.
- Output Status. Single screen details the status of each digital output, value of each modulating output, humidifier current level and the total/ individual term values of the P-I-D output.
- Selectable baud rates (up to 19.2k) for fast data transmission.
- Optional UART expansion card offers concurrent communications ability for LinkUp<sup>®</sup>, IntelliSlot Web Card with Adapter and BMS.

# Diagnostics

- Test Outputs. Individual outputs (both analogue & digital) can be tested or disabled.
- Internal Diagnostics. Automatic function checks for battery integrity every 6 months.

 Battery Backup. On-board battery protects settings and history data in the event of a power outage. Inbuilt brownout protection is also provided.

## **Data Logging**

- Each control alarm is date stamped number, description, date, time and duration.
- Memory maintains 100 most recent alarms
- Display of real time run hours of mode (cool, heat, hum & dehum) and component (cool I & 2, heat I & 2, humidifier) operation.

#### **Alarms**

Standard control alarms include:

- . High & low temperature
- . High & low humidity
- Loss of air
- . High & low refrigerant pressure
- 。 Humidifier low water
- Water under floor
- Spare alarm I & 2 (customised text)
- Service intervals
- Compressor Short Cycle
- 。 Inhibit Heat/Hum
- 。 Condenser Water Flow Fail
- Low battery
- Loss of power

### Other alarm features include:

- Facility to enable or disable individual alarms for general alarm action.
- Display all active alarms number, identification, date, time and duration.
- Spare alarm input selection for heat/humidifier disable (genset/aux power) and condenser water flow failure
- Selectable temperature/humidity alarm setpoints.
- Airloss alarm. Adjustable sensitivity and actual sensor value indication.
- Service Interval alarms. Cool, filter & humidifier maintenance prompt alarms can have customised values.

For more detailed information on the CEMS I 00 controller please refer to the *Installation*, Operation & Maintenance manual.



# **GENERAL**

## Summary

These specifications describe requirements for a precision environmental control system. The system shall be designed to maintain temperature and humidity conditions in the rooms containing critical equipment. The manufacturer shall design and furnish all equipment to be fully compatible with heat dissipation requirements of the room.

# **Design Requirements**

The precision environmental control systems shall be a Liebert PeX model \_\_\_\_\_\_\_ self-contained factory assembled unit with (upflow) (downflow) air delivery. The system shall have a total cooling capacity of \_\_\_\_\_ kW, with a sensible cooling capacity of \_\_\_\_\_ kW, based on an entering air temperature of \_\_\_\_\_ °C dry bulb and \_\_\_\_\_ °C wet bulb. The unit is to be supplied with \_\_\_\_\_ volt \_\_\_ ph \_\_\_ Hz electrical service and include a rating nameplate stating the unit FLA or kW/kVA in accordance with Australian Standard AS/NZS3100:2002 Clause 7.1.

# **PRODUCT**

#### **Cabinet Construction**

The frame shall be constructed of 2.5, 2.0 and 1.2 mm folded galvanised steel. The external panels shall be constructed of 1.2mm zinc coated sheet steel. Front, rear and end panels shall be fitted with 25mm glass fibre insulation, fire rated to Australian Standard AS1530 (indices 0,0,0,3). The cabinet shall be powder coated with Dulux "APO Grey" colour and have a textured finish. The hinged front panels shall be removeable and include captive 1/4 turn fasteners. The cabinet shall be assembled with pop rivets providing ease of disassembly.

#### **Filtration**

The filter chamber shall be an integral part of the system and withdrawable from the front of the unit. Filtration shall be provided by deep V form, G4 performance, dry disposable media and labelled in accordance with Australian Standard AS/NZS1324.1.

#### Fans

The fan section shall be designed for \_\_\_\_\_\_ I/s at an external static pressure of \_\_\_\_\_ Pa. The fans shall be located downstream of the evaporator coil and be of the forward curved centrifugal type, double width, double inlet and statically and dynamically balanced to G6.3 DIN ISO 1940 part I. Each fan shall be separately driven by a MEPS compliant, EFFI efficiency electric motor rated at \_\_\_\_\_ kW at \_\_\_\_ RPM with an IP55

enclosure rating. The drive arrangement shall be self-tensioning and provide for belt replacement without the use of tools. The motor base plate shall include locators to ensure optimum axial alignment of the motor.

## Humidifier

Humidification shall be provided by boiling water in a high temperature polypropylene steam generator. The steam shall be distributed evenly into the bypass airstream to ensure full integration of the water vapour into the supply air without condensation. The humidifier shall be capable of providing \_\_\_ steam per hour. The humidifier shall have an efficiency of not less than 1.3 kg/kW and be fitted with an auto flush cycle activated on demand from the microprocessor control system. The humidifier shall be fully serviceable with replaceable electrodes. Waste water shall be flushed from the humidifier by the initiation of the water supply solenoid water valve via a U-pipe overflow system. Drain solenoid valves will not be used. The humidifier shall be approved for direct connection to potable water supplies in accordance with Australian Standard ATS 5200.101 and carry the WaterMark label. Humidifier steam nozzles shall be readily accessible for inspection and cleaning in accordance with Australian Standard AS/ NZS3666.2:2002 Clause 2.3.3.1

### **Electrical Heating**

The electric heating elements shall operate at a heat density level not exceeding 60 kW/m². The low watt density elements shall be of finned tubular steel construction finished in high temperature paint. The heating system shall include dual safety protection through loss of air and manual reset high temperature controls in accordance with Australian Standard AS/ NZS 3102:2002 Clause 7.3.

# Compressorised Systems Scroll Compressor

The compressor shall be of the high efficiency Compliant Scroll design, with an E.E.R. (energy efficiency ratio) of not less than 11.1 BTUH/watt (C.O.P. of not less than 3.25) at ARI rating conditions. The compressor shall be charged with mineral oil and designed for operation on HCFC R22. The compressor shall be capable of operating with HFC R407C and POE oil. Each compressor shall have internal motor protection and be mounted on vibration isolators.



# Refrigeration Circuit

The refrigeration system shall be of the direct expansion type and incorporate one or more hermetic scroll compressors, complete with crankcase heaters. Cooling steps shall be a maximum of 50% of total unit cooling capacity for one and two compressor models (33% for three compressor models). A hot gas bypass solenoid valve shall be used on single compressor models. The system shall include a manual reset high pressure control, auto reset low pressure switch, externally equalised thermal expansion valve, high sensitivity refrigerant sight glass, large capacity filter drier and charging/access ports in each circuit. Each refrigeration circuit shall include rigidly mounted isolation valves in the discharge and liquid lines to aid servicing and installation (air cooled units only).

# **Evaporator Coil**

The evaporator coil shall be a V-coil (for upflow) / A-coil (for downflow) incorporating draw-through air design for uniform air distribution. The coil shall be constructed of rifled bore copper tubes and louvred aluminium fins, with the frame and drip tray fabricated from heavy gauge aluminium. All metal parts in contact with condensate shall be the same material to prevent electrolytic corrosion. The evaporator drain trays shall be readily accessible for inspection and cleaning in accordance with Australian Standard AS/ NZS3666.1.2002 Clause 2.8.1

The cooling coil shall be a maximum of 4 rows and 55 I fins per metre and the face velocity shall not be more than  $2.5\ m/s$ .

### Dehumidification

Single compressor models

A specific dehumidification cycle (split-suction) shall operate by reducing the operating surface temperature in a section of the refrigeration coil by means of a solenoid valve on the suction header. Full airflow of the unit will be maintained at all times to ensure consistent air distribution to the conditioned space.

# Multiple compressor models

A specific dehumidification cycle (split-liquid) shall operate by reducing the operating surface temperature in a section of one of the refrigeration coils by means of a solenoid valve in the liquid line. Full airflow of the unit will be maintained at all times to ensure consistent air distribution to the conditioned space.

### Remote Air Cooled Condenser

The model \_\_\_\_\_\_ air cooled condenser shall be the low profile, weatherproof type incorporating high efficiency, direct drive, external rotor motors with axial blade fans. The condenser shall balance the heat rejection of the compressor at \_\_\_\_°C ambient. The condenser shall be constructed from heavy duty aluminium and corrosion resistant components. Heavy duty mounting legs and all assembly hardware shall be included. Condensers shall be suitable for 24 hour operation and be capable of providing vertical or horizontal discharge. The condenser shall be fully factory wired and require a 230 volt I phase \_\_\_\_Hz electrical service.

# Fan Speed Control Condenser

The condenser fans shall be directly driven by \_\_\_ pole \_\_\_ rpm 230 volt \_\_\_ Hz electric motors with an IP54 enclosure rating and class F insulation. The motors shall be equipped with permanently sealed ball bearings and high temperature grease. The motors shall be speed controlled to ensure stable operating conditions from -5°C to 45°C ambient by a factory fitted, direct acting pressure actuated fan speed controller. The control system shall be complete with input isolation switch, transducers and pressure switches.

The high performance heat exchanger shall include mechanically expanded cross-hatched copper tubes and louvred aluminium fins for maximum heat transfer. The coil shall be finished in a high performance modified epoxy coating (KirbyKote®) to offer increased protection in aggressive environments.

The coil shall be have a maximum of 3 rows and 472 fins per metre and the face velocity shall not be more than 2.91 m/s.

# **Water Cooled Systems**

The precision environmental control unit shall include a dedicated heat exchanger, water regulating valve and pipework for each refrigeration circuit, complete with refrigerant holding charge. Balancing and isolation valves shall be field supplied and fitted by others. A strainer with I mm mesh must be installed on the supply side of each water circuit by the contractor.



# Water Cooled Condenser & Regulating Valve

The water cooled condenser/heat exchanger shall be of the high efficiency, counterflow, stainless steel brazed plate type rated for 3000 kPa maximum working pressure. Water flow shall be controlled by a 2-way factory fitted, pressure actuated water regulating valve rated for 1000 kPa maximum working pressure.

Water requirements for the unit shall be \_\_\_\_\_ I/s of \_\_\_\_°C entering water based on a \_\_\_\_ K rise and produce a maximum pressure drop of \_\_\_\_ kPa.

### **Unit Size**

The maximum footprint area of the unit shall not exceed:

 $0.72 \text{ m}^2 \text{ up to } 35 \text{ kW}$ 

1.45 m<sup>2</sup> above 35 and up to 70 kW

2.17 m<sup>2</sup> above 70 and up to 100 kW

The unit shall require front access only for routine service and installation work.

#### **Unit Controller**

The unit controller shall be microprocessor based and include a large 115  $\times$  65mm (240  $\times$  128 pixel) LCD backlit graphic display for clear visibility of text and graphics. The display and control buttons shall be accessible from the unit front without removing any external panels. The controller shall feature ISP (In-System-Programming) technology to support program upload via a PC.

Control strategies shall be P-I-D with dew point compensation for accurate temperature and humidity control. A selection of return or supply air control shall be provided to suit the application.

The controller shall have a user-friendly menu driven interface with supporting help screens and shall use multi-protocol data communications. Access to the controller settings shall be protected with three levels of passwords to prevent against unauthorised access. In normal operating mode the main screen shall display unit number, temperature and relative humidity set points and actuals, graphs, time, date and operating status. Dynamic icons shall identify the system operating mode. A 48 hour real time log of temperature and humidity data shall be retained by the control system. All parameters and data shall be protected in memory by an onboard battery.

An EIA-232 communications interface shall provide the capability of remote monitoring with the option of an EIA-485 interface on a 2 or 4 wire connection.

#### **Control**

The control system shall allow programming of the following conditions:

- •Temperature Setpoint: 17 to 32°C (return), 10 to 16°C (supply)
- •Humidity Setpoint: 20 to 65%RH (return)
- •High Temperature Alarm: 15 to 35°C
- •Low Temperature Alarm: 5 to 35°C
- •High Humidity Alarm: 30 to 80%RH
- •Low Humidity Alarm: 10 to 70%RH

The control system shall include the following settable features:

- •Unit identification number
- •Startup Delay, Cold Start Delay and Fan Run On timers
- Sensor Calibration
- •Remote Shutdown & General Alarm management
- Compressor Sequencing
- •Return or supply temperature control
- Choice of Modulating Output types

# **Diagnostics**

Control outputs (both digital and analogue) shall have the facility to be activated or disabled from the front display panel without using jumpers or service tools. A local override feature shall allow service personnel to operate the control system independently of remote high level communications (e.g. building management systems) for safety purposes. Visual indication of manual override status shall be displayed on the main screen.

#### **Alarms**

The microprocessor shall activate an audible, visual and general alarm in the event of any of the following conditions:

- High and Low Temperature
- High and Low Humidity
- •Loss of Air
- •High and Low Pressure
- •Humidifier Low Water
- Water Under Floor
- •Spare Alarm I and 2 (customised text)



These alarms shall have selectable control action - enabled, disabled or off.

The microprocessor shall activate a visual alarm only in the event of any of the following conditions:

- •Service Intervals (cool, filter and humidifier)
- •Compressor Short Cycle
- •Inhibit Heat/Hum (history plus 'Genset' icon)
- •Condenser Water Flow Fail
- Low Battery
- •Loss of Power (history only)
- Unit Off (history only)

All alarm occurrences shall be time and date stamped.

#### **General Alarm Output**

A general alarm output shall be provided to interface enabled alarms via a set of normally open dry contacts.

# **Data Logging**

The control system shall maintain cumulative operating hours of mode (cool, heat, humidify, dehumidify) and component (compressors, heaters, humidifier and fans). The 100 most recent alarms shall be retained in memory.

#### **OPTIONS**

# IntelliSlot Web Card with Adapter

The IntelliSlot Web Card with Adapter shall transform Liebert units with CEMS I 00 controls into manageable nodes within a Network, NMS, and BMS system. This interface card shall concurrently communicate with external systems via the following industry-standard open protocols:

- •Modbus RTU over EIA-485
- •SNMP v I
- •HTTPvI.I

# **UART Communications Expansion Card**

Extends the communications channels available from I to 3 to support concurrent communication to LinkUp, IntelliSlot Web Card with Adapter and BMS systems.

#### LinkUp

A wall mounted supervisory panel providing direct interconnection of up to 40 units into multiple groups or zones providing sequence changeover, standby duties and cascade facility for extra load, with single point access for alarm reporting and system connectivity. Unit to unit interconnection is via flat telephone or twisted pair cable.

# LinkUp-M

An expansion feature to LinkUp offering MODBUS RTU communications for integration to external building management systems. LinkUp-M operates as a slave device on the BMS network, providing a gateway to access status and alarm points from CEMS100 units operating on the LinkUp LAN.

# **Output Alarm Card**

Contact closures for individual alarms shall be provided via a dedicated printed circuit board located in the main unit electrical panel. Alarms shall include high/low temperature, high/low humidity, high/low refrigerant pressure, loss of air, water under floor, low humidifier water level, spare alarm 1/2, cool/heat/hum/dehum mode on.

### R407C

The refrigeration system shall be configured for operation with R407C refrigerant.

# Long Line Pipe Kit

A factory fitted liquid line solenoid valve and discharge check valve (supplied loose) shall be provided for each refrigeration circuit to prevent liquid refrigerant migration to the evaporator/compressor during off cycles in air cooled installations. Note: Mandatory for pipe runs in excess of 30 metres.

# High Pressure Water Regulating Valve

Water flow shall be controlled by a 2-way factory fitted, pressure actuated water regulating valve rated for 2400 kPa maximum working pressure.

# 2 Stage Electric Heating

A second stage of electric heating, complete with manual reset high temperature safety switch, shall be provided to satisfy temperature space conditions.

# **Export Packaging**

A solid timber case shall be provided in addition to the standard domestic packaging.



# **Unit Installation**

To achieve design performance and maximum product life, correct installation is vital. The following information relates specifically to our products and should be applied in conjunction with prevailing industry standards for mechanical and electrical installations. For more detailed information on installing Liebert PeX systems, please refer to the PeX Installation, Operation & Maintenance manual.

# Air Cooled Systems

The PeX air cooled unit is shipped with a factory charged refrigeration system of either R22 or R407C. Each circuit is supplied with I/4 turn isolation valves on the liquid and discharge lines to facilitate installation and servicing. The refrigerant piping must be connected in the field to a matched air cooled condenser and then pressure tested, dehydrated and charged with the same refrigerant. In addition the following services are required to make the system operational:

- electrical supply to the indoor unit
- electrical supply to the air cooled condenser
- 。 humidifier drain
- humidifier water supply

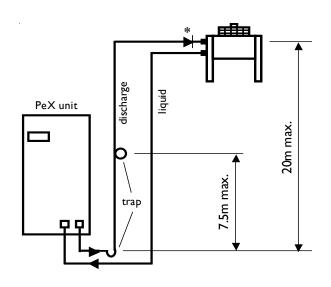
# Refrigeration Piping

All refrigeration piping joints must be high temperature silver brazed. Avoid using solders containing hazardous substances. Any applicable local codes relating to fire safety in terms of pressure relief must be observed. Standard industry procedures must be followed for selection and placement of pipe supports, system evacuation, oil addition and charging with refrigerant. Consideration must be given to pipeline pressure drop, oil return to the compressor, avoidance of oil logging in parts of the system and minimisation of noise and vibration.

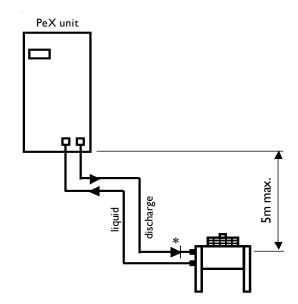
Pipe sizing tables are provided in the *Installation*, *Operation* & *Maintenance* manual for each model and are for 'equivalent lengths', which include an allowance for bends. They are suggestions only and it is the installer's responsibility to confirm that sizes are appropriate for site conditions.

Note: An extended piping kit, comprising a liquid line shutoff valve and discharge line non-return valve\*, is required for equivalent lengths in excess of 30 metres. Consult the factory whenever the equivalent length exceeds 60m, or if the vertical separations exceed those shown.

#### **Condenser Located Above PeX Unit:**



# **Condenser Located Below PeX Unit:**



## Discharge line

Discharge lines should be insulated where they are routed in the conditioned space (including under a raised floor). Traps must be fitted in vertical risers every 7.5 metres and at the base of a riser. Slope discharge lines in the direction of refrigerant flow.

# Liquid line

Liquid lines should not be exposed to any heat sources and should be insulated.

#### Air cooled condenser location

Condensers should be located for maximum security and maintenance accessibility. Vertical or horizontal discharge condensers may be used. The surrounding area should be clean and away from trees, loose dirt and building exhausts.

Please refer to the air cooled condenser technical data manual for more information including dimensions, weights and connection sizes.

# **Water Cooled Systems**

The PeX water cooled unit is shipped with a factory charged refrigeration system of either R22 or R407C, and includes a brazed plate stainless steel plate heat exchanger and 2 way water regulating control valve per circuit. In addition the following services are required to make the system operational:

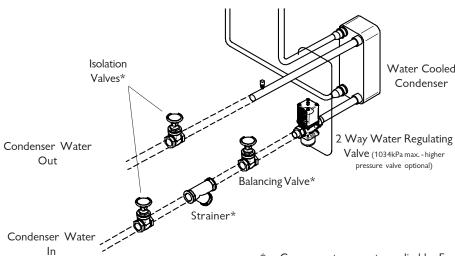
- · electrical supply to the indoor unit
- condenser water supply
- humidifier drain
- · humidifier water supply

# Water Cooled Piping

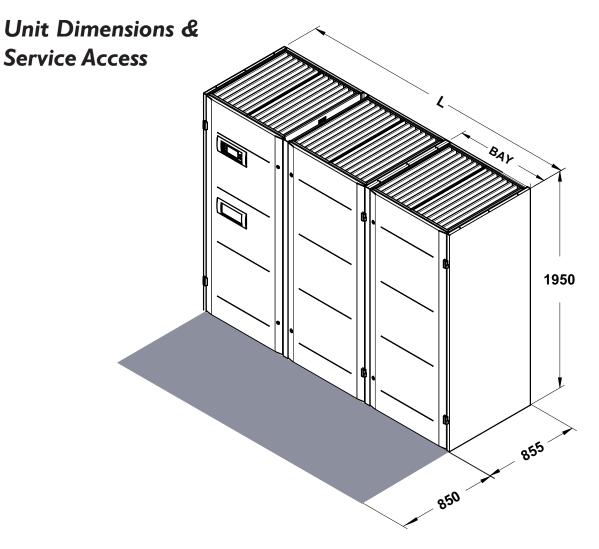
A strainer (with 1mm mesh) and isolation valves on either side, **must** be fitted to the condenser water supply for each unit. A balancing valve is also recommended for each circuit as a minimum to provide adjustment of condenser water flow rates - see diagram below. Refer to the *Installation*, *Operation & Maintenance* manual for details on pipe entry locations.

# **Humidifier / Drain**

A water supply and drain connection is required for each unit. Each unit is shipped with an isolation valve on the water inlet connection for maintenance purposes. For correct unit operation, the drain must be trapped. Refer to the *Installation*, *Operation & Maintenance* manual for further details.

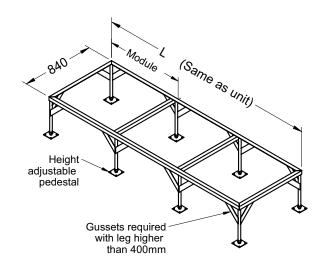


Components are not supplied by Emerson but are required for proper circuit operation and maintenance

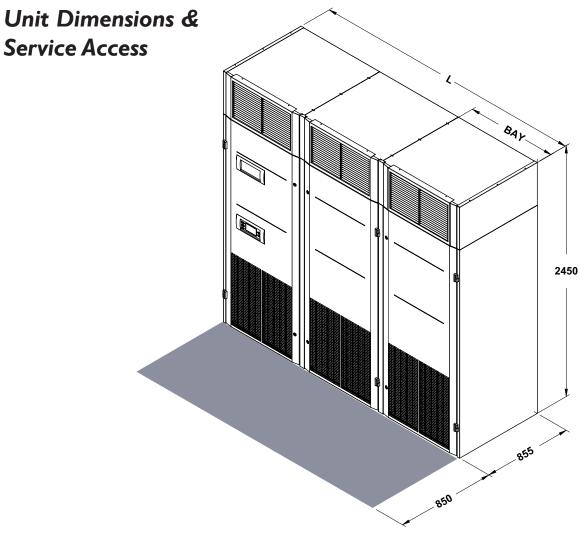


PeX Large Frame - Floor Unit (Type F)

| Paye | Model | Width  |
|------|-------|--------|
| Bays | FA/W  | L (mm) |
| I    | 120   | 850    |
| I    | 125   | 850    |
| I    | 130   | 850    |
| I    | 135   | 850    |
| 2    | 240   | 1700   |
| 2    | 245   | 1700   |
| 2    | 250   | 1700   |
| 2    | 260   | 1700   |
| 2    | 270   | 1700   |
| 3    | 380   | 2550   |
| 3    | 390   | 2550   |
| 3    | 3100  | 2550   |



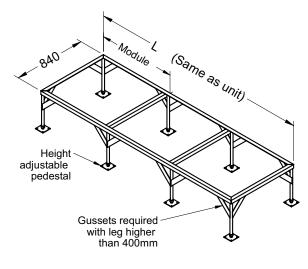
FLOORSTAND (Field Supplied)



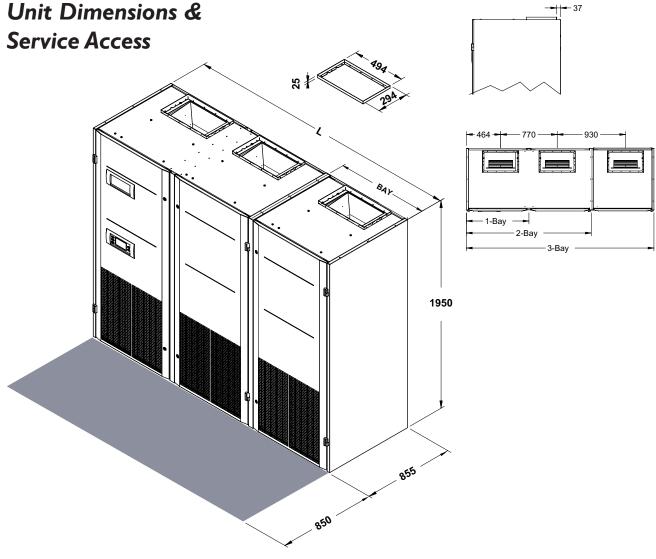
PeX Large Frame - Room Unit (Type R) FOR PLENUM APPLICATIONS

(400mm HIGH PLENUM SHOWN IS OPTIONAL)

| Baye | Model | Width  |
|------|-------|--------|
| Bays | RA/W  | L (mm) |
| I    | 120   | 850    |
| I    | 125   | 850    |
| I    | 130   | 850    |
| I    | 135   | 850    |
| 2    | 240   | 1700   |
| 2    | 245   | 1700   |
| 2    | 250   | 1700   |
| 2    | 260   | 1700   |
| 2    | 270   | 1700   |
| 3    | 380   | 2550   |
| 3    | 390   | 2550   |
| 3    | 3100  | 2550   |

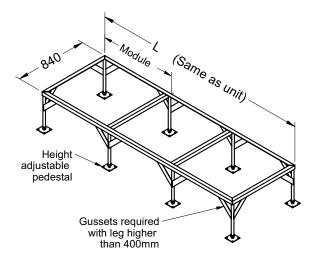


FLOORSTAND (Field Supplied)



PeX Large Frame - Ducted Unit (Type D)
FOR DUCTED APPLICATIONS

| Bays | Model | Width  |
|------|-------|--------|
|      | DA/W  | L (mm) |
| I    | 120   | 850    |
| I    | 125   | 850    |
| I    | 130   | 850    |
| I    | 135   | 850    |
| 2    | 240   | 1700   |
| 2    | 245   | 1700   |
| 2    | 250   | 1700   |
| 2    | 260   | 1700   |
| 2    | 270   | 1700   |
| 3    | 380   | 2550   |
| 3    | 390   | 2550   |
| 3    | 3100  | 2550   |



FLOORSTAND (Field Supplied)



# Precision Cooling

# **PeX Large Frame**

# 50Hz Technical Data

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