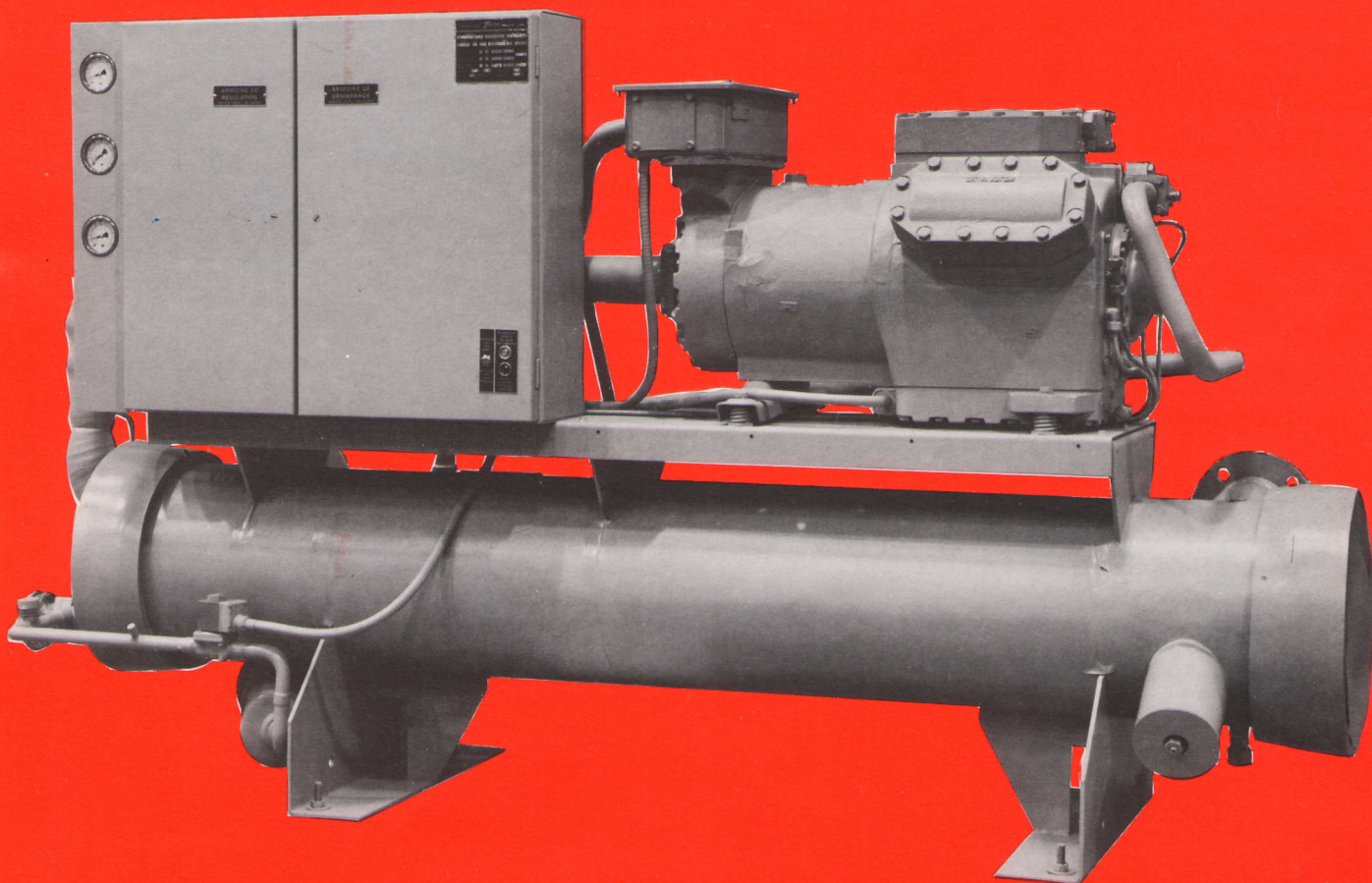




# WATER-TO-WATER HEAT PUMPS

18 UNIT SIZES

HEATING CAPACITIES FROM 60 TO 725 kW





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**TRANE Water-to-Water Heat Pumps for commercial and industrial applications:  
Energy efficient, reliable and dependable.**

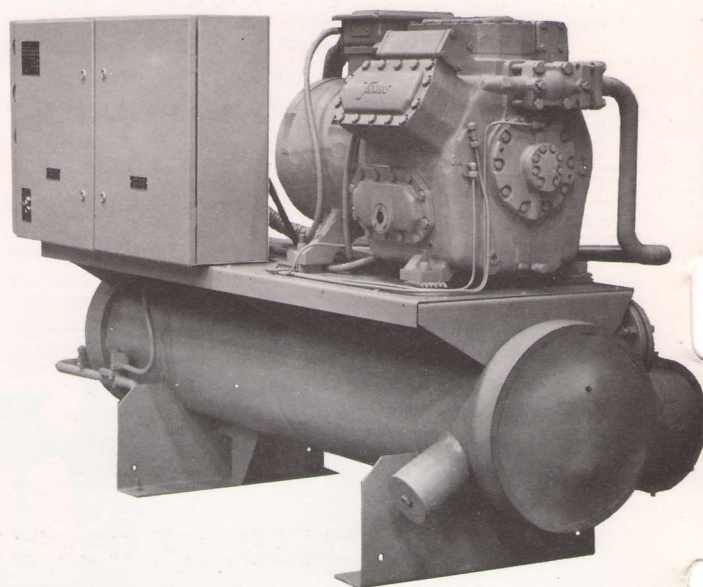
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### **SINGLE CIRCUIT HEAT PUMPS**

Unit sizes 101 to 109 are fitted with one industrial-type, semi-hermetic TRANE compressor with multi-step capacity control. These units should be used for systems where the total capacity required is divided up for reasons of safety into two or several machines.

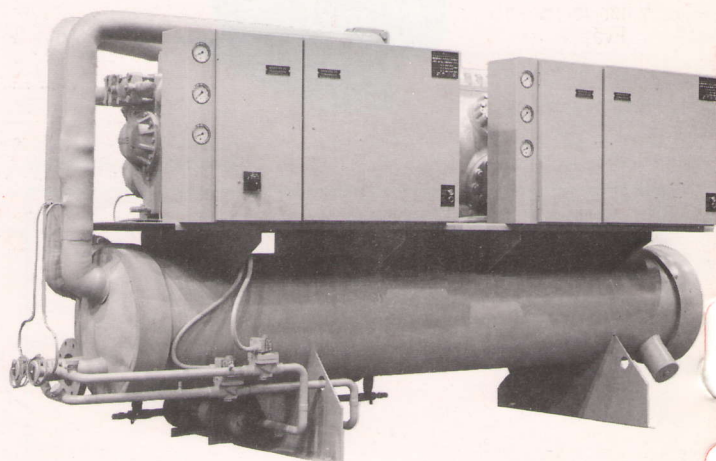
Two completely independent units always offer increased operational safety and true standby capability, compared to a single machine with multiple compressors.

Preventive maintenance or repairs on multi-compressor units require complete shutdown of the machine, in the case of two independent machines, one machine continues to function while the other one is being serviced. In addition, single circuit machines generally provide better full load and part load efficiency than machines of identical capacity with two or more compressors.



### **DUAL-CIRCUIT HEAT PUMPS**

Unit sizes 206 to 215 use two industrial-type, semi-hermetic TRANE compressors which operate on completely independent refrigeration circuits, including separate starter and control panels. Unit sizes with capacities above 350 kW always have two compressors; in the range from 180 to 350 kW dual-circuit as well as single circuit units are available. Dual-circuit machines require less floor space than two single-circuit machines of equal capacity but also offer less operational safety than independent units, a deciding factor for a heat pump installation.





## CAPACITIES, DIMENSIONS, ELECTRICAL DATA SINGLE CIRCUIT MACHINES

| MODEL                               | CGWA | 101 M  | 102 M  | 103 M  | 104 M | 105 R | 106 R | 107 R | 108 E | 109 E  |
|-------------------------------------|------|--------|--------|--------|-------|-------|-------|-------|-------|--------|
| Heating capacity (1)                | kW   | 60.8   | 87.5   | 94.5   | 114.3 | 148.6 | 185.4 | 226.8 | 267.9 | 355.0  |
| Power input (1)                     | kW   | 16.6   | 20.7   | 24.7   | 30.7  | 39.3  | 46.7  | 57.6  | 68.1  | 87.5   |
| No of cylinders                     |      | 3      | 4      | 6      | 6     | 4     | 6     | 6     | 6     | 8      |
| Full load Amps (2)                  | A    | 37     | 39     | 46     | 57    | 81    | 85    | 106   | 113   | 154    |
| Starting Amps (3)                   | A    | 96     | 125    | 146    | 208   | 252   | 304   | 358   | 426   | 581    |
| Length                              | mm   | 1870   | 1870   | 2090   | 2160  | 2160  | 2230  | 2400  | 2420  | 2850   |
| Width                               | mm   | 710    | 710    | 710    | 790   | 830   | 1010  | 1010  | 1010  | 1070   |
| Height                              | mm   | 1200   | 1200   | 1200   | 1250  | 1275  | 1330  | 1300  | 1420  | 1560   |
| Water connections<br>Evaporator (4) |      | 1 1/2" | 1 1/2" | 2"     | ND 65 | ND 65 | ND 80 | ND 80 | ND 80 | ND 100 |
| Condenser (5)                       |      | 1 1/2" | 1 1/2" | 1 1/2" | 2"    | 2"    | 3"    | 3"    | 3"    | ND 100 |
| Operating weight                    | kg   | 550    | 565    | 625    | 750   | 900   | 1180  | 1190  | 1530  | 1980   |

## CAPACITIES, DIMENSIONS, ELECTRICAL DATA DUAL CIRCUIT MACHINES

| MODEL                               | CGWA | 206 M  | 207 M | 208 R | 209 R  | 211 R  | 213 E  | 214 E  | 215 E  |
|-------------------------------------|------|--------|-------|-------|--------|--------|--------|--------|--------|
| Heating capacity (1)                | kW   | 188.7  | 228.2 | 297.5 | 370.5  | 453.4  | 530.0  | 631.9  | 725.0  |
| Power input (1)                     | kW   | 49.3   | 61.3  | 78.5  | 93.4   | 115.2  | 136.4  | 156.4  | 175.5  |
| No. of cylinders                    |      | 2 × 6  | 2 × 6 | 2 × 4 | 2 × 6  | 2 × 6  | 2 × 6  | 6 + 8  | 2 × 8  |
| Full load Amps (2)                  | A    | 92     | 114   | 162   | 170    | 212    | 226    | 267    | 308    |
| Starting Amps (3)                   | A    | 192    | 265   | 333   | 389    | 464    | 539    | 694    | 735    |
| Length                              | mm   | 2400   | 2500  | 2700  | 2850   | 2850   | 2900   | 4050   | 4050   |
| Width                               | mm   | 1020   | 1040  | 1170  | 1170   | 1170   | 1170   | 1370   | 1370   |
| Height                              | mm   | 1300   | 1300  | 1400  | 1500   | 1500   | 1600   | 1700   | 1700   |
| Water connections<br>Evaporator (4) |      | ND 80  | ND 80 | ND 80 | ND 80  | ND 125 | ND 125 | ND 100 | ND 100 |
| Condenser (5)                       |      | 2 1/2" | 3"    | 3"    | ND 100 | ND 100 | ND 100 | ND 125 | ND 125 |
| Operating weight                    | kg   | 1300   | 1420  | 1800  | 2280   | 2340   | 2950   | 3520   | 3730   |

- (1) At 40/50°C condenser entering/leaving water temperature, 15/10°C evaporator entering/leaving water temperature, fouling factor 0.035 m<sup>2</sup>K/kW, Refrigerant 22, 50 Hz power supply, nominal size heat exchangers. Maximum condenser leaving water temperature with R22 = 55°C. Oversized heat exchangers for reduced power consumption, optional. Selections for higher condenser leaving water temperatures, using Refrigerant 500 or 12 are available upon request.
- (2) At 5 bar suction pressure, 25 bar discharge pressure. Power supply 415/3/50.
- (3) Partwinding start. Starting amps for dual circuit machines at most unfavorable condition : Compressor 1 at full load operation, compressor 2 starting.
- (4) Evaporator water connections : Threaded connections ISO R7 on sizes 101 through 103, flanged connections on all other sizes. Max. water side operating pressure 14 bar.
- (5) Condenser water connections : Female pipe thread ISO R7 on all sizes, except 109 and 209 through 215 which have flanged connections. Max. water side operating pressure 14 bar.



# MECHANICAL SPECIFICATIONS

## SINGLE-CIRCUIT HEAT PUMPS MODELS CGWA 101 M TO 109 E

Water-to-water heat pump, factory assembled and wired, consisting of:

### COMPRESSOR

Semi-hermetic, industrial type Trane compressor with built-in suction gas-cooled motor. Multi-step electric capacity control. Ring type, high strength suction and discharge valves. Lubrication system including self-reversing oil pump, oil filter, crankcase heater and sight glass.

Compressor fully accessible and completely rebuildable.

Compressor motor with part winding start, protected by winding overheat protectors and external thermal overloads.

### CONDENSER

Shell and tube design, consisting of steel shell welded to thick steel tube sheets. Seamless integrally finned copper tubes mechanically expanded into the grooved tube sheets. Built-in liquid subcooler. Removable heads of close grain cast iron.

### EVAPORATOR

Shell and tube design with refrigerant inside the tubes and water circulating in the shell. Consists of steel shell welded to thick steel tube sheets. Seamless copper tubes mechanically expanded into grooved tube sheets. Refrigerant heads of high strength cast steel bolted to the tube sheets. Self-energizing type gaskets requiring low bolt torque. Evaporator insulated with flexible, closed-cell polyvinylchloride.

### STARTER AND CONTROL PANEL

Separate compartments each with a hinged door and lock for electric and refrigerant controls. Includes compressor motor part winding starters and overloads. High and low refrigerant pressure and oil pressure controls, water temperature controller, freeze protection thermostat, control relays. Mounted externally are high and low refrigerant pressure and oil pressure gauges.

## DUAL-CIRCUIT HEAT PUMPS MODELS CGWA 206 M TO 215 E

Water-to-water heat pump with two completely separate refrigeration circuits, factory assembled and wired, consisting of:

### TWO COMPRESSORS

Semi-hermetic, industrial type Trane compressors with built-in suction gas-cooled motor. Multi-step electric capacity control. Ring type, high strength suction and discharge valves. Lubrication system including self-reversing oil pump, oil filter, crankcase heater and sight glass.

Compressors fully accessible and completely rebuildable.

Compressor motor with part winding start, protected by winding overheat protectors and external thermal overloads.

### CONDENSER

Shell-and-tube design with two separate refrigerant circuits. Consists of steel shell with welded-in centre tube sheet and side tube sheets. Seamless, integrally finned copper tubes mechanically expanded into grooved tube sheets. Integral liquid subcooler. Removable water heads of close grain cast iron.

### EVAPORATOR

Shell-and-tube design, with two refrigerant side circuits. Consists of steel shell and welded-on steel tube sheets. Seamless copper tubes mechanically expanded into grooved tubes sheets. Refrigerant heads of high strength cast steel bolted to the tube sheets. Self energizing type seal requiring low bolt torque.

Thermal insulation of evaporator of flexible closed-cell polyvinylchloride.

### TWO STARTER AND CONTROL PANELS

Completely separate starter and control panels for both refrigerant circuits, each with separate compartments for electric and refrigerant controls.

Includes part winding starters, overload relays, high, low, and oil pressure controls.

Common for both circuits are 4-step temperature controller, freeze protection thermostat and leadlag sequence switch. Both circuits with high, low, and oil pressure gauges.



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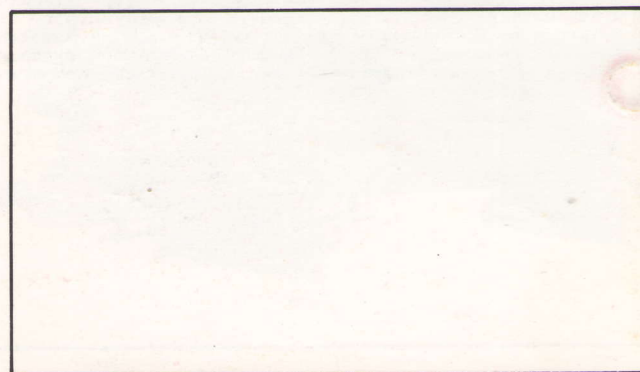
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Subject to modifications



ER7W/CA8-E-WH-1182

Printed in France Studio Trane



# CGWA 101 Z to 109 E

## Single circuit units

**Table 1 — Cooling capacity and power input (50 Hz)**

| Model      | Leaving chilled water temp. (°C) | Condenser leaving water temperature |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
|------------|----------------------------------|-------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|            |                                  | 30°C                                |                       | 32°C                  |                       | 35°C                  |                       | 40°C                  |                       | 45°C                  |                       | 50°C                  |                       |
|            |                                  | Cooling capacity (kW)               | Compressor input (kW) | Cooling capacity (kW) | Compressor input (kW) | Cooling capacity (kW) | Compressor input (kW) | Cooling capacity (kW) | Compressor input (kW) | Cooling capacity (kW) | Compressor input (kW) | Cooling capacity (kW) | Compressor input (kW) |
| CGWA 101 Z | 5                                | 52.1                                | 11.9                  | 51.1                  | 12.2                  | 49.4                  | 12.6                  | 46.7                  | 13.5                  | 43.9                  | 14.3                  | 41.1                  | 15.2                  |
|            | 6                                | 53.9                                | 12.0                  | 52.7                  | 12.3                  | 51.1                  | 12.8                  | 48.2                  | 13.7                  | 45.3                  | 14.6                  | 42.5                  | 15.4                  |
|            | 7                                | 55.7                                | 12.1                  | 54.5                  | 12.4                  | 52.7                  | 13.0                  | 49.9                  | 13.9                  | 46.9                  | 14.8                  | 44.0                  | 15.7                  |
|            | 8                                | 57.5                                | 12.2                  | 56.2                  | 12.6                  | 54.5                  | 13.1                  | 51.5                  | 14.1                  | 48.5                  | 15.0                  | 45.5                  | 15.9                  |
|            | 9                                | 59.3                                | 12.3                  | 58.1                  | 12.7                  | 56.2                  | 13.3                  | 53.3                  | 14.2                  | 50.2                  | 15.2                  | 47.0                  | 16.2                  |
|            | 10                               | 61.1                                | 12.5                  | 59.8                  | 12.9                  | 58.1                  | 13.4                  | 54.9                  | 14.4                  | 51.8                  | 15.4                  | 48.6                  | 16.4                  |
| CGWA 102 Z | 5                                | 65.1                                | 14.7                  | 64.0                  | 15.1                  | 62.0                  | 15.8                  | 58.6                  | 16.9                  | 54.8                  | 18.0                  | 50.6                  | 19.1                  |
|            | 6                                | 67.3                                | 14.8                  | 66.0                  | 15.3                  | 64.1                  | 16.0                  | 60.6                  | 17.1                  | 56.6                  | 18.2                  | 52.5                  | 19.4                  |
|            | 7                                | 69.4                                | 15.0                  | 68.2                  | 15.4                  | 66.1                  | 16.1                  | 62.5                  | 17.2                  | 58.5                  | 18.5                  | 54.3                  | 19.7                  |
|            | 8                                | 71.6                                | 15.1                  | 70.2                  | 15.6                  | 68.2                  | 16.3                  | 64.5                  | 17.4                  | 60.4                  | 18.7                  | 56.0                  | 20.0                  |
|            | 9                                | 73.9                                | 15.2                  | 72.5                  | 15.7                  | 70.2                  | 16.5                  | 66.4                  | 17.7                  | 62.3                  | 18.9                  | 57.9                  | 20.3                  |
|            | 10                               | 76.1                                | 15.4                  | 74.7                  | 15.9                  | 72.4                  | 16.7                  | 68.4                  | 17.9                  | 64.3                  | 19.2                  | 59.7                  | 20.6                  |
| CGWA 103 Z | 5                                | 75.2                                | 17.5                  | 73.9                  | 18.0                  | 71.7                  | 18.7                  | 67.9                  | 19.8                  | 63.9                  | 21.0                  | 59.5                  | 22.1                  |
|            | 6                                | 77.8                                | 17.6                  | 76.3                  | 18.1                  | 74.0                  | 18.9                  | 70.1                  | 20.1                  | 66.0                  | 21.3                  | 61.7                  | 22.3                  |
|            | 7                                | 80.1                                | 17.8                  | 78.7                  | 18.3                  | 76.4                  | 19.1                  | 72.3                  | 20.4                  | 68.2                  | 21.6                  | 63.8                  | 22.7                  |
|            | 8                                | 82.6                                | 18.0                  | 81.2                  | 18.5                  | 78.8                  | 19.3                  | 74.7                  | 20.6                  | 70.3                  | 21.9                  | 66.0                  | 23.0                  |
|            | 9                                | 85.1                                | 18.2                  | 83.6                  | 18.7                  | 81.2                  | 19.5                  | 77.0                  | 20.8                  | 72.6                  | 22.1                  | 68.1                  | 23.4                  |
|            | 10                               | 87.8                                | 18.3                  | 86.1                  | 18.9                  | 83.6                  | 19.7                  | 79.4                  | 21.1                  | 74.9                  | 22.4                  | 70.3                  | 23.7                  |
| CGWA 104 Z | 5                                | 94.7                                | 22.0                  | 92.6                  | 22.5                  | 89.6                  | 23.3                  | 84.6                  | 24.7                  | 79.5                  | 26.2                  | 74.5                  | 27.6                  |
|            | 6                                | 98.0                                | 22.1                  | 95.8                  | 22.7                  | 92.7                  | 23.6                  | 87.4                  | 25.1                  | 82.3                  | 26.6                  | 77.0                  | 28.1                  |
|            | 7                                | 101.2                               | 22.5                  | 99.2                  | 22.9                  | 96.0                  | 23.8                  | 90.5                  | 25.4                  | 85.2                  | 26.9                  | 79.8                  | 28.5                  |
|            | 8                                | 104.6                               | 22.5                  | 102.5                 | 23.1                  | 99.2                  | 24.1                  | 93.7                  | 25.7                  | 88.3                  | 27.2                  | 82.6                  | 28.9                  |
|            | 9                                | 108.1                               | 22.7                  | 105.9                 | 23.4                  | 102.6                 | 24.3                  | 97.0                  | 26.0                  | 91.3                  | 27.6                  | 85.4                  | 29.4                  |
|            | 10                               | 111.7                               | 22.9                  | 109.4                 | 23.6                  | 106.0                 | 24.6                  | 100.2                 | 26.3                  | 94.3                  | 28.0                  | 88.4                  | 29.8                  |
| CGWA 105 R | 5                                | 119.7                               | 28.3                  | 117.3                 | 29.1                  | 113.7                 | 30.3                  | 107.5                 | 32.2                  | 101.3                 | 34.0                  | 94.9                  | 35.8                  |
|            | 6                                | 123.6                               | 28.6                  | 121.2                 | 29.4                  | 117.4                 | 30.7                  | 111.2                 | 32.6                  | 104.9                 | 34.5                  | 98.4                  | 36.3                  |
|            | 7                                | 127.5                               | 28.9                  | 125.1                 | 29.7                  | 121.4                 | 31.0                  | 115.1                 | 33.0                  | 108.5                 | 35.0                  | 101.8                 | 36.8                  |
|            | 8                                | 131.6                               | 29.1                  | 129.1                 | 30.0                  | 125.3                 | 31.4                  | 118.9                 | 33.4                  | 112.3                 | 35.5                  | 105.5                 | 37.3                  |
|            | 9                                | 135.5                               | 29.4                  | 133.1                 | 30.3                  | 129.3                 | 31.7                  | 122.9                 | 33.8                  | 116.2                 | 35.9                  | 109.1                 | 37.9                  |
|            | 10                               | 139.7                               | 29.7                  | 137.2                 | 30.7                  | 133.4                 | 32.0                  | 127.0                 | 34.2                  | 120.1                 | 36.4                  | 112.9                 | 38.4                  |
| CGWA 106 R | 5                                | 151.9                               | 33.9                  | 149.0                 | 34.9                  | 144.5                 | 36.4                  | 136.8                 | 38.7                  | 129.0                 | 40.9                  | 120.9                 | 42.8                  |
|            | 6                                | 156.6                               | 34.2                  | 153.7                 | 35.2                  | 149.2                 | 36.7                  | 141.4                 | 39.1                  | 133.4                 | 41.4                  | 125.1                 | 43.4                  |
|            | 7                                | 161.5                               | 34.4                  | 158.5                 | 35.5                  | 153.9                 | 37.0                  | 146.0                 | 39.5                  | 137.8                 | 41.8                  | 129.4                 | 44.0                  |
|            | 8                                | 166.3                               | 34.7                  | 163.3                 | 35.8                  | 158.7                 | 37.3                  | 150.7                 | 39.9                  | 142.4                 | 42.2                  | 133.6                 | 44.6                  |
|            | 9                                | 171.3                               | 34.9                  | 168.3                 | 36.0                  | 163.6                 | 37.6                  | 155.4                 | 40.3                  | 147.0                 | 42.7                  | 138.1                 | 45.1                  |
|            | 10                               | 176.4                               | 35.1                  | 173.3                 | 37.2                  | 168.5                 | 37.9                  | 160.4                 | 40.6                  | 151.6                 | 43.2                  | 142.5                 | 45.6                  |

(1) Cooling capacities and power inputs are based on a fouling factor of 0.035 m<sup>2</sup>K/kW in the evaporator and the condenser. For different fouling factors, refer to general notes, paragraph 1.3.

(2) The ratings are valid for a water temperature difference of 4°C to 8°C in the evaporator and the condenser.

(3) Compressor kW inputs are given at full load.

(4) Direct interpolation between rating points is permissible. Extrapolation is not permitted.

(5) For all selections outside of the tabulated range, contact your Trane Sales Office.



## Single circuit units

**Table 2 — Electrical and general data (50 Hz)**

| Model                                | CGWA    | 101 Z       | 102 Z       | 103 Z       | 104 Z       | 105 R       | 106 R        | 107 R        | 108 E           | 109 E           |
|--------------------------------------|---------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|-----------------|-----------------|
| Compressor model                     |         | CRHZ<br>154 | CRHZ<br>200 | CRHZ<br>250 | CRHZ<br>300 | CRHR<br>400 | CRHR<br>500  | CRHR<br>600  | L2E-61N         | L2E-81N         |
| Number of compressors                |         | 1           | 1           | 1           | 1           | 1           | 1            | 1            | 1               | 1               |
| Number of cylinders                  |         | 4           | 4           | 4           | 6           | 4           | 6            | 6            | 6               | 8               |
| Capacity control                     | %       | 100-50      | 100-50      | 100-50      | 100-67      | 100-50      | 100-67<br>33 | 100-67<br>33 | 100-67<br>50-33 | 100-75<br>50-37 |
| Crankcase heater power<br>(220/1/50) | W       | 140         | 140         | 140         | 140         | 140         | 140          | 140          | 100             | 100             |
| Compressor rated                     | 380 V A | 35          | 41          | 49          | 61          | 88          | 93           | 116          | 123             | 169             |
| load amps (1)                        | 415 V A | 32          | 37          | 45          | 56          | 81          | 85           | 106          | 113             | 154             |
| Compressor                           | 380 V A | 83          | 98          | 122         | 148         | 231         | 278          | 328          | 390             | 532             |
| starting amps (2)                    | 415 V A | 91          | 107         | 133         | 162         | 252         | 304          | 358          | 426             | 581             |
| Evaporator model                     | EVP     | 282         | 282         | 283         | 284         | 285         | 286          | 287          | 288             | 289/2           |
| Water storage capacity               | l       | 30          | 30          | 38          | 58          | 51          | 103          | 102          | 88              | 164             |
| Condenser model (3)                  | CDS     | 258         | 259         | 259         | 260         | 261         | 262          | 263          | 264             | 268/2           |
| Water storage capacity (3)           | l       | 7           | 10          | 10          | 11          | 14          | 18           | 21           | 25              | 45              |
| Shipping                             | CGWA kg | 558         | 575         | 604         | 772         | 870         | 1110         | 1120         | 1450            | 1810            |
| weight                               | CCUA kg | 488         | 505         | 534         | 640         | 770         | 960          | 960          | 1280            | 1520            |
| Operating                            | CGWA kg | 550         | 565         | 600         | 740         | 900         | 1180         | 1190         | 1512            | 1978            |
| weight                               | CCUA kg | 478         | 479         | 518         | 624         | 778         | 1002         | 1004         | 1322            | 1632            |
| R22 operating                        | CGWA kg | 14          | 14          | 15          | 18          | 23          | 25           | 33           | 36              | 45              |
| charge                               | CCUA kg | 7           | 7           | 7           | 9           | 11          | 11           | 16           | 18              | 23              |
| Unit oil charge                      | l       | 4.0         | 4.5         | 4.5         | 4.75        | 9.5         | 13           | 13           | 18              | 19              |

(1) Compressor rated load amps based on compressor running at 5 bar suction pressure, 25 bar discharge pressure.

(2) Part-winding start.

(3) CGWA only.