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|                     |              |          |               |
|---------------------|--------------|----------|---------------|
| Summary of          | JAMA Star-24 | Reg. No. | 012-SC0667-18 |
| Certificate Holder  |              |          |               |
| Name                | Kaukora      |          |               |
| Address             | Tuotekatu 11 | Zip      | FI-21200      |
| City                | Raisio       | Country  | Finland       |
| Certification Body  | RISE CERT    |          |               |
| Subtype title       | JAMA Star-24 |          |               |
| Heat Pump Type      | Brine/Water  |          |               |
| Refrigerant         | R407c        |          |               |
| Mass of Refrigerant | 4 kg         |          |               |

## Model: Star-24

| Configure model                     |                       |
|-------------------------------------|-----------------------|
| Model name                          | Star-24               |
| Application                         | Heating (medium temp) |
| Units                               | Indoor                |
| Climate Zone                        | Colder Climate        |
| Reversibility                       | No                    |
| Cooling mode application (optional) | n/a                   |

| General Data |             |
|--------------|-------------|
| Power supply | 3x400V 50Hz |

### Heating

| EN 14511-4   |        |
|--|--------|
| Operating range outdoor exchanger/indoor exchanger lower limit/lower limit | passed |
| Operating range outdoor exchanger/indoor exchanger upper limit/upper limit | passed |
| Shutting off the heat transfer medium flow                                 | passed |
| Complete power supply failure  | passed |

| EN 14511-2  |                 |                    |
|-------------|-----------------|--------------------|
|             | Low temperature | Medium temperature |
| Heat output | 23.00 kW        | 22.00 kW           |
| El input    | 4.90 kW         | 7.12 kW            |
| COP         | 4.65            | 3.09               |

### Colder Climate

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### EN 12102-1

|                          | Low temperature | Medium temperature |
|--------------------------|-----------------|--------------------|
| Sound power level indoor | 47 dB(A)        | 47 dB(A)           |

### EN 14825

|               | Low temperature | Medium temperature |
|---------------|-----------------|--------------------|
| $\eta_s$      | 193 %           | 150 %              |
| Prated        | 28.00 kW        | 28.00 kW           |
| SCOP          | 5.03            | 3.95               |
| Tbiv          | -16 °C          | -15 °C             |
| TOL           | -22 °C          | -22 °C             |
| Pdh Tj = -7°C | 23.80 kW        | 22.70 kW           |
| COP Tj = -7°C | 4.98            | 3.73               |
| Pdh Tj = +2°C | 12.00 kW        | 11.60 kW           |
| COP Tj = +2°C | 5.28            | 4.26               |
| Pdh Tj = +7°C | 12.10 kW        | 11.80 kW           |
| COP Tj = +7°C | 5.38            | 4.57               |
| Pdh Tj = 12°C | 12.10 kW        | 11.90 kW           |
| COP Tj = 12°C | 5.08            | 4.74               |
| Pdh Tj = Tbiv | 23.70 kW        | 22.40 kW           |
| COP Tj = Tbiv | 4.78            | 3.46               |

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|   |             |             |
|---|-------------|-------------|
| $P_{dh} T_j = TOL$ or $P_{dh} T_j = T_{designh}$ if $TOL < T_{designh}$ | 23.50 kW    | 22.00 kW    |
| $COP T_j = TOL$ or $COP T_j = T_{designh}$ if $TOL < T_{designh}$       | 4.57        | 3.10        |
| $C_{dh} T_j = TOL$ or $P_{dh} T_j = T_{designh}$ if $TOL < T_{designh}$ | 0.98        | 0.99        |
| WTOL  | 65 °C       | 65 °C       |
| Poff  | 2 W         | 2 W         |
| PTO   | 60 W        | 60 W        |
| PSB   | 7 W         | 7 W         |
| PCK   | 70 W        | 70 W        |
| Supplementary Heater: Type of energy input                              | Electricity | Electricity |
| Supplementary Heater: PSUP  | 4.50 kW     | 6.00 kW     |
| Annual energy consumption $Q_{he}$                                      | 13740 kWh   | 17514 kWh   |

## Average Climate

| <b>EN 12102-1</b>        |                        |                           |
|--------------------------|------------------------|---------------------------|
|                          | <b>Low temperature</b> | <b>Medium temperature</b> |
| Sound power level indoor | 47 dB(A)               | 47 dB(A)                  |

| <b>EN 14825</b> |                        |                           |
|-----------------|------------------------|---------------------------|
|                 | <b>Low temperature</b> | <b>Medium temperature</b> |
| $\eta_s$        | 185 %                  | 143 %                     |
| Prated          | 28.00 kW               | 28.00 kW                  |

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|   |          |          |
|---|----------|----------|
| SCOP  | 4.83     | 3.78     |
| Tbiv  | -6 °C    | -5 °C    |
| TOL   | -10 °C   | -10 °C   |
| Pdh Tj = -7°C                                       | 23.60 kW | 22.20 kW |
| COP Tj = -7°C                                       | 4.70     | 3.27     |
| Pdh Tj = +2°C                                       | 23.80 kW | 22.80 kW |
| COP Tj = +2°C                                       | 4.91     | 3.83     |
| Pdh Tj = +7°C                                       | 12.00 kW | 11.70 kW |
| COP Tj = +7°C                                       | 5.26     | 4.31     |
| Pdh Tj = 12°C                                       | 12.10 kW | 11.80 kW |
| COP Tj = 12°C                                       | 5.26     | 4.58     |
| Pdh Tj = Tbiv                                       | 23.60 kW | 22.40 kW |
| COP Tj = Tbiv                                       | 4.73     | 3.45     |
| Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh | 23.50 kW | 22.00 kW |
| COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh | 4.57     | 3.10     |
| Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh | 0.98     | 0.99     |
| WTOL  | 65 °C    | 65 °C    |
| Poff  | 2 W      | 2 W      |
| PTO   | 30 W     | 30 W     |
| PSB   | 7 W      | 7 W      |
| PCK   | 70 W     | 70 W     |

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|  |             |             |
|--|-------------|-------------|
| Supplementary Heater: Type of energy input | Electricity | Electricity |
| Supplementary Heater: PSUP                 | 4.50 kW     | 6.00 kW     |
| Annual energy consumption Q <sub>he</sub>  | 11996 kWh   | 15287 kWh   |