

Summary of	JAMA Star-16 inverter	Reg. No.	012-SC0666-18	
Certificate Holder	-			
Name	Kaukora	Kaukora		
Address	Tuotekatu 11	Zip	FI-21200	
City	Raisio	Country	Finland	
Certification Body	RISE CERT		·	
Name of testing laboratory	AIT			
Subtype title	JAMA Star-16 inverter			
Heat Pump Type	Brine/Water and Water/Wa	Brine/Water and Water/Water		
Refrigerant	R407c			
Mass Of Refrigerant	2.2 kg			



## Model: Star-16 inverter

General Data	
Power supply	3x400V 50Hz

Brine/Water Heat Pump

#### Heating

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

EN 14511-2		
	Low temperature	Medium temperature
Heat output	8.89 kW	8.54 kW
El input	1.83 kW	2.72 kW
СОР	4.85	3.14
Indoor water flow rate	2.76 m³/h	1.72 m³/h

#### **Average Climate**



EN 12102-1		
	Low temperature	Medium temperature
Sound power level indoor	42 dB(A)	42 dB(A)

EN 14825			
	Low temperature	Medium temperature	
$\eta_{s}$	199 %	154 %	
Prated	16.00 kW	16.00 kW	
SCOP	5.18	4.05	
Tbiv	-10 °C	-10 °C	
TOL	-10 °C	-10 °C	
Pdh Tj = -7°C	14.20 kW	14.20 kW	
COP Tj = -7°C	4.19	3.00	
Pdh Tj = +2°C	8.70 kW	8.70 kW	
COP Tj = +2°C	5.26	4.10	
Pdh Tj = +7°C	5.70 kW	5.60 kW	
COP Tj = +7°C	6.06	4.90	
Pdh Tj = 12°C	5.80 kW	5.50 kW	
COP Tj = 12°C	5.85	5.00	
Pdh Tj = Tbiv	15.90 kW	16.00 kW	
COP Tj = Tbiv	3.90	2.80	





Pdh Tj = TOL	15.90 kW	16.00 kW
COP Tj = TOL	3.90	2.80
Cdh	0.98	0.99
WTOL	65 °C	65 °C
Poff	2 W	2 W
РТО	30 W	30 W
PSB	7 W	7 W
PCK	30 W	30 W
Supplementary Heater: Type of energy input	electricity	electricity
Supplementary Heater: PSUP	0.10 kW	0.00 kW
Annual energy consumption Qhe	6373 kWh	8167 kWh

EN 12102-1		
	Low temperature	Medium temperature
Sound power level indoor	42 dB(A)	42 dB(A)

EN 14825		
Low temperature	Medium temperature	
211 %	159 %	
16.00 kW	16.00 kW	
	Low temperature 211 %	





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SCOP	5.48	4.18
Tbiv	-22 °C	-22 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	9.80 kW	9.80 kW
COP Tj = -7°C	5.10	3.80
Pdh Tj = +2°C	6.00 kW	6.00 kW
COP Tj = +2°C	6.10	4.70
Pdh Tj = +7°C	5.70 kW	5.60 kW
$COP Tj = +7^{\circ}C$	6.10	5.00
Pdh Tj = 12°C	5.70 kW	5.60 kW
COP Tj = 12°C	5.60	5.00
Pdh Tj = Tbiv	15.90 kW	16.00 kW
COP Tj = Tbiv	3.90	2.80
Pdh Tj = TOL	15.90 kW	16.00 kW
COP Tj = TOL	3.90	2.80
Cdh	0.99	0.99
WTOL	65 °C	65 °C
Poff	2 W	2 W
РТО	30 W	30 W
PSB	7 W	7 W
PCK	30 W	30 W





Supplementary Heater: Type of energy input	electricity	electricity
Supplementary Heater: PSUP	0.10 kW	0.00 kW
Annual energy consumption Qhe	7218 kWh	9434 kWh

Water/Water Heat Pump

#### Heating

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

EN 14511-2		
	Low temperature	Medium temperature
Heat output	11.20 kW	10.90 kW
El input	1.84 kW	2.79 kW
СОР	6.11	3.91
Indoor water flow rate	3.27 m³/h	2.05 m³/h

#### **Average Climate**



EN 12102-1			
Low temperature Medium temperature			
Sound power level indoor	42 dB(A)	42 dB(A)	

EN 14825		
	Low temperature	Medium temperature
$\eta_{s}$	265 %	202 %
Prated	19.00 kW	19.00 kW
SCOP	6.47	5.00
Tbiv	-10 °C	-10 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	16.90 kW	16.90 kW
COP Tj = -7°C	5.34	3.82
Pdh Tj = +2°C	10.30 kW	10.30 kW
COP Tj = +2°C	6.61	5.08
Pdh Tj = +7°C	7.20 kW	7.00 kW
COP Tj = +7°C	7.50	5.93
Pdh Tj = 12°C	7.30 kW	7.10 kW
COP Tj = 12°C	7.61	6.28
Pdh Tj = Tbiv	19.00 kW	19.00 kW
COP Tj = Tbiv	5.01	3.51





Pdh Tj = TOL	19.00 kW	19.00 kW
COP Tj = TOL	5.01	3.51
Cdh	0.97	0.98
WTOL	65 °C	65 °C
Poff	2 W	2 W
РТО	45 W	35 W
PSB	10 W	7 W
PCK	30 W	30 W
Supplementary Heater: Type of energy input	electricity	electricity
Supplementary Heater: PSUP	0.00 kW	0.00 kW
Annual energy consumption Qhe	6070 kWh	7834 kWh

EN 12102-1			
Low temperature Medium temperature			
Sound power level indoor	42 dB(A)	42 dB(A)	

EN 14825		
Low temperature	Medium temperature	
265 %	202 %	
19.00 kW	19.00 kW	
	Low temperature 265 %	





Tbiv       -22 °C       -22 °C         TOL       -22 °C       -22 °C         Pdh Tj = -7°C       11.60 kW       11.60 kW         COP Tj = -7°C       6.51       4.82         Pdh Tj = +2°C       7.30 kW       7.10 kW         COP Tj = +2°C       7.56       5.87         Pdh Tj = +7°C       7.30 kW       7.00 kW         COP Tj = +7°C       7.62       6.24         Pdh Tj = 12°C       7.46       6.47         Pdh Tj = Tbiv       19.00 kW       19.00 kW         COP Tj = Tbiv       5.01       3.51         Pdh Tj = TOL       5.01       3.51         COP Tj = TOL       5.01       3.51         Cdh       0.96       0.98         WTOL       65 °C       65 °C         Poff       2 W       2 W	
Pdh Tj = -7°C	
COP Tj = -7°C	
Pdh Tj = $+2^{\circ}$ C       7.30 kW       7.10 kW         COP Tj = $+2^{\circ}$ C       7.56       5.87         Pdh Tj = $+7^{\circ}$ C       7.30 kW       7.00 kW         COP Tj = $+7^{\circ}$ C       7.62       6.24         Pdh Tj = $12^{\circ}$ C       7.30 kW       7.00 kW         COP Tj = $12^{\circ}$ C       7.46       6.47         Pdh Tj = Tbiv       19.00 kW       19.00 kW         COP Tj = Tbiv       5.01       3.51         Pdh Tj = TOL       19.00 kW       19.00 kW         COP Tj = TOL       5.01       3.51         Cdh       0.96       0.98         WTOL       65 °C       65 °C	
COP Tj = +2°C 7.56 5.87  Pdh Tj = +7°C 7.30 kW 7.00 kW  COP Tj = +7°C 7.62 6.24  Pdh Tj = 12°C 7.30 kW 7.00 kW  COP Tj = 12°C 7.46 6.47  Pdh Tj = Tbiv 19.00 kW 19.00 kW  COP Tj = Tbiv 5.01 3.51  Pdh Tj = TOL 19.00 kW 19.00 kW  COP Tj = TOL 5.01 3.51  Cdh 0.96 0.98  WTOL 65 °C 65 °C	
Pdh Tj = +7°C       7.30 kW       7.00 kW         COP Tj = +7°C       7.62       6.24         Pdh Tj = 12°C       7.30 kW       7.00 kW         COP Tj = 12°C       7.46       6.47         Pdh Tj = Tbiv       19.00 kW       19.00 kW         COP Tj = Tbiv       5.01       3.51         Pdh Tj = TOL       19.00 kW       19.00 kW         COP Tj = TOL       5.01       3.51         Cdh       0.96       0.98         WTOL       65 °C       65 °C	
COP Tj = +7°C 7.62 6.24  Pdh Tj = 12°C 7.30 kW 7.00 kW  COP Tj = 12°C 7.46 6.47  Pdh Tj = Tbiv 19.00 kW 19.00 kW  COP Tj = Tbiv 5.01 3.51  Pdh Tj = TOL 19.00 kW 19.00 kW  COP Tj = TOL 5.01 3.51  Cdh 0.96 0.98  WTOL 65 °C 65 °C	
Pdh Tj = 12°C       7.30 kW       7.00 kW         COP Tj = 12°C       7.46       6.47         Pdh Tj = Tbiv       19.00 kW       19.00 kW         COP Tj = Tbiv       5.01       3.51         Pdh Tj = TOL       19.00 kW       19.00 kW         COP Tj = TOL       5.01       3.51         Cdh       0.96       0.98         WTOL       65 °C       65 °C	
COP Tj = 12°C       7.46       6.47         Pdh Tj = Tbiv       19.00 kW       19.00 kW         COP Tj = Tbiv       5.01       3.51         Pdh Tj = TOL       19.00 kW       19.00 kW         COP Tj = TOL       5.01       3.51         Cdh       0.96       0.98         WTOL       65 °C       65 °C	
Pdh Tj = Tbiv       19.00 kW       19.00 kW         COP Tj = Tbiv       5.01       3.51         Pdh Tj = TOL       19.00 kW       19.00 kW         COP Tj = TOL       5.01       3.51         Cdh       0.96       0.98         WTOL       65 °C       65 °C	
COP Tj = Tbiv $5.01$ $3.51$ Pdh Tj = TOL $19.00 \text{ kW}$ $19.00 \text{ kW}$ COP Tj = TOL $5.01$ $3.51$ Cdh $0.96$ $0.98$ WTOL $65  ^{\circ}\text{C}$ $65  ^{\circ}\text{C}$	
Pdh Tj = TOL       19.00 kW       19.00 kW         COP Tj = TOL       5.01       3.51         Cdh       0.96       0.98         WTOL       65 °C       65 °C	
COP Tj = TOL 5.01 3.51  Cdh 0.96 0.98  WTOL 65 °C 65 °C	
Cdh       0.96       0.98         WTOL       65 °C       65 °C	
WTOL 65 °C 65 °C	
Poff 2 W 2 W	
PTO 45 W 35 W	
PSB 10 W 7 W	
PCK 30 W 30 W	



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Supplementary Heater: Type of energy input	electricity	electricity
Supplementary Heater: PSUP	0.00 kW	0.00 kW
Annual energy consumption Qhe	6861 kWh	8907 kWh



## **Model: Star-16 RST inverter**

General Data		
Power supply	3x400V 50Hz	
Off-peak product	No	

Brine/Water Heat Pump

#### Heating

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

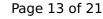
EN 14511-2		
	Low temperature	Medium temperature
Heat output	8.89 kW	8.54 kW
El input	1.83 kW	2.72 kW
СОР	4.85	3.14
Indoor water flow rate	2.76 m³/h	1.72 m³/h

#### Average Climate



EN 12102-1			
Low temperature Medium temperature			
Sound power level indoor	42 dB(A)	42 dB(A)	

EN 14825		
	Low temperature	Medium temperature
$\eta_{s}$	199 %	154 %
Prated	16.00 kW	16.00 kW
SCOP	5.18	4.05
Tbiv	-10 °C	-10 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	14.20 kW	14.20 kW
COP Tj = -7°C	4.19	3.00
Pdh Tj = +2°C	8.70 kW	8.70 kW
COP Tj = +2°C	5.26	4.10
Pdh Tj = +7°C	5.70 kW	5.60 kW
COP Tj = +7°C	6.06	4.90
Pdh Tj = 12°C	5.80 kW	5.50 kW
COP Tj = 12°C	5.85	5.00
Pdh Tj = Tbiv	15.90 kW	16.00 kW
COP Tj = Tbiv	3.90	2.80

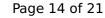




Pdh Tj = TOL	15.90 kW	16.00 kW
COP Tj = TOL	3.90	2.80
Cdh	0.98	0.99
WTOL	65 °C	65 °C
Poff	2 W	2 W
РТО	30 W	30 W
PSB	7 W	7 W
PCK	30 W	30 W
Supplementary Heater: Type of energy input	electricity	electricity
Supplementary Heater: PSUP	0.10 kW	0.00 kW
Annual energy consumption Qhe	6373 kWh	8167 kWh

EN 12102-1		
	Low temperature	Medium temperature
Sound power level indoor	42 dB(A)	42 dB(A)

EN 14825		
	Low temperature	Medium temperature
$\eta_{s}$	211 %	159 %
Prated	16.00 kW	16.00 kW





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SCOP	5.48	4.18
Tbiv	-22 °C	-22 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	9.80 kW	9.80 kW
COP Tj = -7°C	5.10	3.80
Pdh Tj = +2°C	6.00 kW	6.00 kW
COP Tj = +2°C	6.10	4.70
Pdh Tj = $+7^{\circ}$ C	5.70 kW	5.60 kW
$COPTj = +7^{\circ}C$	6.10	5.00
Pdh Tj = 12°C	5.70 kW	5.60 kW
COP Tj = 12°C	5.60	5.00
Pdh Tj = Tbiv	15.90 kW	16.00 kW
COP Tj = Tbiv	3.90	2.80
Pdh Tj = TOL	15.90 kW	16.00 kW
COP Tj = TOL	3.90	2.80
Cdh	0.99	0.99
WTOL	65 °C	65 °C
Poff	2 W	2 W
РТО	30 W	30 W
PSB	7 W	7 W
PCK	30 W	30 W



Supplementary Heater: Type of energy input	electricity	electricity
Supplementary Heater: PSUP	0.10 kW	0.00 kW
Annual energy consumption Qhe	7218 kWh	9434 kWh

#### Domestic Hot Water (DHW)

#### Average Climate

EN 16147	
Declared load profile	XL
Efficiency ηDHW	98 %
СОР	2.45
Heating up time	01:04 h:min
Standby power input	50.0 W
Reference hot water temperature	50.0 °C
Mixed water at 40°C	240



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EN 16147	
Declared load profile	XL
Efficiency ηDHW	98 %
СОР	2.45
Heating up time	01:04 h:min
Standby power input	50.0 W
Reference hot water temperature	50.0 °C
Mixed water at 40°C	240

Water/Water Heat Pump

#### Heating

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

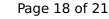


EN 14511-2		
	Low temperature	Medium temperature
Heat output	11.20 kW	10.90 kW
El input	1.84 kW	2.79 kW
СОР	6.11	3.91
Indoor water flow rate	3.27 m³/h	2.05 m³/h

#### Average Climate

EN 12102-1		
	Low temperature	Medium temperature
Sound power level indoor	42 dB(A)	42 dB(A)

EN 14825		
	Low temperature	Medium temperature
$\eta_{s}$	265 %	202 %
Prated	19.00 kW	19.00 kW
SCOP	6.47	5.00
Tbiv	-10 °C	-10 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	16.90 kW	16.90 kW
COP Tj = -7°C	5.34	3.82



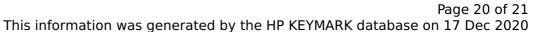


Pdh Tj = +2°C	10.30 kW	10.30 kW
COP Tj = +2°C	6.61	5.08
Pdh Tj = +7°C	7.20 kW	7.00 kW
$COP Tj = +7^{\circ}C$	7.50	5.93
Pdh Tj = 12°C	7.30 kW	7.10 kW
COP Tj = 12°C	7.61	6.28
Pdh Tj = Tbiv	19.00 kW	19.00 kW
COP Tj = Tbiv	5.01	3.51
Pdh Tj = TOL	19.00 kW	19.00 kW
COP Tj = TOL	5.01	3.51
Cdh	0.97	0.98
WTOL	65 °C	65 °C
Poff	2 W	2 W
РТО	45 W	35 W
PSB	10 W	7 W
PCK	30 W	30 W
Supplementary Heater: Type of energy input	electricity	electricity
Supplementary Heater: PSUP	0.00 kW	0.00 kW
Annual energy consumption Qhe	6070 kWh	7834 kWh
	•	



EN 12102-1		
	Low temperature	Medium temperature
Sound power level indoor	42 dB(A)	42 dB(A)

	EN 14825	
	Low temperature	Medium temperature
$\eta_{s}$	265 %	202 %
Prated	19.00 kW	19.00 kW
SCOP	6.82	5.25
Tbiv	-22 °C	-22 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	11.60 kW	11.60 kW
COP Tj = -7°C	6.51	4.82
Pdh Tj = +2°C	7.30 kW	7.10 kW
COP Tj = +2°C	7.56	5.87
Pdh Tj = +7°C	7.30 kW	7.00 kW
COP Tj = +7°C	7.62	6.24
Pdh Tj = 12°C	7.30 kW	7.00 kW
COP Tj = 12°C	7.46	6.47
Pdh Tj = Tbiv	19.00 kW	19.00 kW
COP Tj = Tbiv	5.01	3.51





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Pdh Tj = TOL	19.00 kW	19.00 kW
COP Tj = TOL	5.01	3.51
Cdh	0.96	0.98
WTOL	65 °C	65 °C
Poff	2 W	2 W
РТО	45 W	35 W
PSB	10 W	7 W
PCK	30 W	30 W
Supplementary Heater: Type of energy input	electricity	electricity
Supplementary Heater: PSUP	0.00 kW	0.00 kW

6861 kWh

8907 kWh

Domestic Hot Water (DHW)

Annual energy consumption Qhe

Average Climate



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EN 16147		
Declared load profile	XL	
Efficiency ηDHW	113 %	
СОР	2.82	
Heating up time	00:58 h:min	
Standby power input	45.0 W	
Reference hot water temperature	45.0 °C	
Mixed water at 40°C	235 I	

EN 16147		
Declared load profile	XL	
Efficiency ηDHW	113 %	
СОР	2.82	
Heating up time	00:58 h:min	
Standby power input	45.0 W	
Reference hot water temperature	45.0 °C	
Mixed water at 40°C	235 I	