

**Heat pump model** **Master Therm** **BA22IP-0, BA22IP-1**

Heat pump type	Air/Water
Supplementary heater	Yes
Heat pump combination heater	No

Reference heating season	<b>Average</b>		<b>SCOP</b>	
Reference water temperature	<b>LOW, 35°C</b>		<b>4,24</b>	
Full load heating	<b>Prated [kW]</b>	<b>4,10</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>167</b>	<b>A++</b>	
Annual electricity consumption	<b>Q<sub>HE</sub> [kWh]</b>	<b>1996</b>		
<b>Average 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	T <sub>j</sub> [°C]	P <sub>dh</sub> [kW]	COP <sub>d</sub> (-)	C <sub>dh</sub> (-)
A	-7	3,62	2,56	0,900
B	2	2,28	4,18	0,900
C	7	1,51	6,53	0,900
D	12	1,52	8,00	0,900
TOL (E)	-10	3,35	2,42	0,900
Tbivalent (F)	-7	3,62	2,56	0,900

Reference heating season	<b>Average</b>		<b>SCOP</b>	
Reference water temperature	<b>High, 55°C</b>		<b>3,35</b>	
Full load heating	<b>Prated [kW]</b>	<b>3,87</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>131</b>	<b>A++</b>	
Annual electricity consumption	<b>Q<sub>HE</sub> [kWh]</b>	<b>2385</b>		
<b>Average 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	T <sub>j</sub> [°C]	P <sub>dh</sub> [kW]	COP <sub>d</sub> (-)	C <sub>dh</sub> (-)
A	-7	3,43	1,99	0,900
B	2	2,16	3,27	0,900
C	7	1,40	5,13	0,900
D	12	1,40	6,38	0,914
TOL (E)	-10	3,14	1,85	0,900
Tbivalent (F)	-7	3,43	1,99	0,900

Reference heating season	<b>Warmer</b>			
Reference water temperature	<b>Low, 35°C</b>			
Full load heating	<b>Prated [kW]</b>	<b>4,28</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>230</b>		
Annual electricity consumption	<b>Q<sub>HE</sub> [kWh]</b>	<b>981</b>		
<b>Warmer 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	T <sub>j</sub> [°C]	P <sub>dh</sub> [kW]	COP <sub>d</sub> (-)	C <sub>dh</sub> (-)
B	2	4,28	3,24	0,900
C	7	2,81	5,69	0,900
D	12	1,54	8,30	0,897
TOL (E)	2	4,28	3,24	0,900
Tbivalent (F)	2	4,28	3,24	0,900

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Reference heating season		<b>Warmer</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>4,01</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>169</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>1249</b>	
<b>Warmer 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	<b>Tj [°C]</b>	<b>Pdh [kW]</b>	<b>COPd (-)</b>	<b>Cdh (-)</b>
B	2	4,01	2,35	0,900
C	7	2,60	3,91	0,900
D	12	1,39	6,18	0,916
TOL (E)	2	4,01	2,35	0,900
Tbivalent (F)	2	4,01	2,35	0,900

Reference heating season		<b>Colder</b>		
Reference water temperature		<b>Low, 35°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>6,06</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>129</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>4524</b>	
<b>Colder 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	<b>Tj [°C]</b>	<b>Pdh [kW]</b>	<b>COPd (-)</b>	<b>Cdh (-)</b>
A	-7	3,67	2,72	0,900
B	2	2,31	4,48	0,900
C	7	1,52	6,77	0,900
D	12	1,52	8,00	0,900
TOL (E)	-20	2,49	2,01	0,900
Tbivalent (F)	-7	3,67	2,72	0,900
G	-15	2,94	2,28	0,900

Reference heating season		<b>Colder</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>5,18</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>109</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>4545</b>	
<b>Colder 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	<b>Tj [°C]</b>	<b>Pdh [kW]</b>	<b>COPd (-)</b>	<b>Cdh (-)</b>
A	-7	3,14	2,26	0,900
B	2	1,94	3,66	0,900
C	7	1,27	5,56	0,900
D	12	1,43	6,73	0,911
TOL (E)	-20	2,29	1,60	0,900
Tbivalent (F)	-7	3,14	2,26	0,900
G	-15	2,62	1,86	0,900

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Power consumption in modes other than "active mode"		
Off mode	$P_{OFF}$ [kW]	0,019
Thermostat off mode	$P_{TO}$ [kW]	0,019
Standby mode	$P_{SB}$ [kW]	0,019
Crankcaseheater mode	$P_{CK}$ [kW]	-

Supplementary heater capacity	$P_{sup}$ [kW]	4,5(+4,5)
Supplementary heater type	[-]	electricity

Capacity control		Variable
Sound power level Indoor	$L_{WA}$ [dBA]	-
Sound power level Outdoor	$L_{WA}$ [dBA]	50
Rated airflow	[m <sup>3</sup> /h]	max.3000

Temperature controller		
Type	Carel pCO5/pCO5+/uPC, Master Therm custom SW	
Class	II	
Contribution	%	2,0

Temperature controller + Room Terminal		
Type	Carel pCO5/pCO5+/uPC + pAD, Master Therm custom SW	
Class	VI	
Contribution	%	4,0

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Information sheet			
Temperature application		Low, 35°C	High, 55°C
Space heating energy efficiency class, Average climate	-	A++	A++
Nominal heating capacity Pdesign, Average climate	kW	4	4
Space heating seasonal efficiency, Average climate	%	167	131
Space heating annual electricity consumption, Average cl.	kWh	1996	2385

Nominal heating capacity Pdesign, Colder climate	kW	6	5
Space heating seasonal efficiency, Colder climate	%	129	109
Space heating annual electricity consumption, Colder cl.	kWh	4524	4545

Nominal heating capacity Pdesign, Warmer climate	kW	4	4
Space heating seasonal efficiency, Warmer climate	%	230	169
Space heating annual electricity consumption, Warmer cl.	kWh	981	1249

Sound power level Lwa Outdoor	dBA	50
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Information sheet for energy efficiency Set with Temperature controller			
Temperature application		Low, 35°C	High, 55°C
Controller Carel pCO5/pCO5+/uPC, Class	-	II	II
Controller Carel pCO5/pCO5+/uPC, Contribution	%	2,0	2,0
Set Space heating seasonal efficiency, Average climate	%	169	133
Set Space heating energy efficiency class, Average climate	-	A++	A++
Set Space heating seasonal efficiency, Colder climate	%	131	111
Set Space heating seasonal efficiency, Warmer climate	%	232	171

Information sheet for energy efficiency Set with Temperature controller + Room Terminal			
Temperature application		Low, 35°C	High, 55°C
Controller Carel pCO5/pCO5+/uPC + pAD, Class	-	VI	VI
Controller Carel pCO5/pCO5+/uPC, +pAD, Contribution	%	4,0	4,0
Set Space heating seasonal efficiency, Average climate	%	171	135
Set Space heating energy efficiency class, Average climate	-	A++	A++
Set Space heating seasonal efficiency, Colder climate	%	133	113
Set Space heating seasonal efficiency, Warmer climate	%	234	173