

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA22I-1</b>
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Heat pump type	Air/Water
Supplementary heater	Yes
Heat pump combination heater	No

Reference heating season		<b>Average</b>		
Reference water temperature		<b>LOW, 35°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>4.51</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>172</b>		
Annual electricity consumption	<b><math>Q_{HE}</math> [kWh]</b>	<b>2128</b>		
<b>Average 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cdh (-)
A	-7	3.99	2.74	0.900
B	2	2.58	4.16	0.900
C	7	1.64	6.22	0.900
D	12	2.08	7.50	0.938
TOL (E)	-10	3.64	2.61	0.900
Tbivalent (F)	-7	3.99	2.74	0.900

Reference heating season		<b>Average</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>4.44</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>130</b>		
Annual electricity consumption	<b><math>Q_{HE}</math> [kWh]</b>	<b>2759</b>		
<b>Average 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cdh (-)
A	-7	3.93	2.03	0.900
B	2	2.45	3.15	0.900
C	7	1.69	4.74	0.900
D	12	1.96	5.73	0.950
TOL (E)	-10	3.68	1.90	0.900
Tbivalent (F)	-7	3.93	2.03	0.900

Reference heating season		<b>Warmer</b>		
Reference water temperature		<b>Low, 35°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>5.32</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>239</b>		
Annual electricity consumption	<b><math>Q_{HE}</math> [kWh]</b>	<b>1176</b>		
<b>Warmer 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cdh (-)
B	2	5.32	3.34	0.900
C	7	3.78	5.20	0.976
D	12	1.58	7.76	0.900
TOL (E)	2	5.32	3.34	0.900
Tbivalent (F)	2	5.32	3.34	0.900

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA22I-1</b>
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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>5.08</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>164</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>1626</b>	
<b>Warmer 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cd <sub>h</sub> (-)
B	2	5.08	2.25	0.900
C	7	3.54	3.52	0.900
D	12	1.95	5.56	0.951
TOL (E)	2	5.08	2.25	0.900
Tbivalent (F)	2	5.08	2.25	0.900

Reference heating season		<b>Colder</b>		
Reference water temperature		<b>Low, 35°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>6.55</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>134</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>4717</b>	
<b>Colder 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cd <sub>h</sub> (-)
A	-7	3.97	2.91	0.900
B	2	2.61	4.47	0.900
C	7	1.56	6.42	0.900
D	12	2.08	7.50	0.938
TOL (E)	-22	2.64	2.34	0.900
Tbivalent (F)	-7	3.97	2.91	0.900
G	-15	3.15	2.56	0.900

Reference heating season		<b>Colder</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>6.49</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>110</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>5643</b>	
<b>Colder 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cd <sub>h</sub> (-)
A	-7	3.93	2.33	0.900
B	2	2.50	3.53	0.900
C	7	1.73	5.18	0.948
D	12	1.99	6.12	0.947
TOL (E)	-22	2.84	1.88	0.900
Tbivalent (F)	-7	3.93	2.33	0.900
G	-15	3.26	2.05	0.900

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA22I-1</b>
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Power consumption in modes other than "active mode"		
Off mode	P <sub>OFF</sub> [kW]	0.018
Thermostat off mode	P <sub>TO</sub> [kW]	0.017
Standby mode	P <sub>SB</sub> [kW]	0.018
Crankcaseheater mode	P <sub>CK</sub> [kW]	-

Supplementary heater capacity	P <sub>sup</sub> [kW]	4,5(+4,5)
Supplementary heater type	[-]	electricity

Capacity control		Variable
Sound power level Indoor	L <sub>WA</sub> [dBA]	-
Sound power level Outdoor	L <sub>WA</sub> [dBA]	63
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

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA22I-1</b>
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<b>Information sheet</b>			
Temperature application		Low, 35°C	High, 55°C
Space heating energy efficiency class, Average climate	-	A++	A++
Nominal heating capacity Pdesign, Average climate	kW	5	4
Space heating seasonal efficiency, Average climate	%	172	130
Space heating annual electricity consumption, Average cl.	kWh	2128	2759

Nominal heating capacity Pdesign, Colder climate	kW	7	6
Space heating seasonal efficiency, Colder climate	%	134	110
Space heating annual electricity consumption, Colder cl.	kWh	4717	5643

Nominal heating capacity Pdesign, Warmer climate	kW	5	5
Space heating seasonal efficiency, Warmer climate	%	239	164
Space heating annual electricity consumption, Warmer cl.	kWh	1176	1626

Sound power level Lwa Outdoor	dBA	63
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<b>Information sheet for energy efficiency Set with Temperature controller</b>			
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	%	174	132
Set Space heating energy efficiency class, Average climate	-	A++	A++
Set Space heating seasonal efficiency, Colder climate	%	136	112
Set Space heating seasonal efficiency, Warmer climate	%	241	166

<b>Information sheet for energy efficiency Set with Temperature controller + Room Terminal</b>			
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	%	176	134
Set Space heating energy efficiency class, Average climate	-	A+++	A++
Set Space heating seasonal efficiency, Colder climate	%	138	114
Set Space heating seasonal efficiency, Warmer climate	%	243	168

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA26I-1</b>
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Heat pump type	Air/Water
Supplementary heater	Yes
Heat pump combination heater	No

Reference heating season		<b>Average</b>		
Reference water temperature		<b>LOW, 35°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>6.51</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>168</b>	<b>A++</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>3139</b>	
<b>Average 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	5.76	2.59	0.900
B	2	3.72	3.91	0.900
C	7	2.42	6.53	0.900
D	12	2.74	7.21	0.951
TOL (E)	-10	5.88	2.52	0.900
Tbivalent (F)	-7	5.76	2.59	0.900

Reference heating season		<b>Average</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>6.33</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>126</b>	<b>A++</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>4039</b>	
<b>Average 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	5.60	1.94	0.900
B	2	3.50	3.02	0.900
C	7	2.33	4.69	0.900
D	12	2.78	5.55	0.963
TOL (E)	-10	5.66	1.82	0.900
Tbivalent (F)	-7	5.60	1.94	0.900

Reference heating season		<b>Warmer</b>		
Reference water temperature		<b>Low, 35°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>7.67</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>259</b>		
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>1567</b>	
<b>Warmer 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
B	2	7.67	3.41	0.900
C	7	5.10	5.85	0.900
D	12	2.52	8.10	0.944
TOL (E)	2	7.67	3.41	0.900
Tbivalent (F)	2	7.67	3.41	0.900

Heat pump model		Master Therm		BA26I-1	
Reference heating season			Warmer		
Reference water temperature			High, 55°C		
Full load heating		Prated [kW]	7.40		
Seasonal efficiency		$\eta_s$ [%]	177		
Annual electricity consumption		$Q_{HE}$ [kWh]	2199		
Warmer 55°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient	
	Outdoor air				
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)	
B	2	7.40	2.21	0.900	
C	7	5.17	3.71	0.900	
D	12	2.46	6.09	0.957	
TOL (E)	2	7.40	2.21	0.900	
Tbivalent (F)	2	7.40	2.21	0.900	
Reference heating season			Colder		
Reference water temperature			Low, 35°C		
Full load heating		Prated [kW]	9.65		
Seasonal efficiency		$\eta_s$ [%]	132		
Annual electricity consumption		$Q_{HE}$ [kWh]	5987		
Colder 35°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient	
	Outdoor air				
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)	
A	-7	5.84	2.70	0.900	
B	2	3.54	4.55	0.900	
C	7	2.97	6.82	0.960	
D	12	3.45	7.50	0.959	
TOL (E)	-22	4.16	2.08	0.900	
Tbivalent (F)	-7	5.84	2.70	0.900	
G	-15	4.81	2.32	0.900	
Reference heating season			Colder		
Reference water temperature			High, 55°C		
Full load heating		Prated [kW]	9.31		
Seasonal efficiency		$\eta_s$ [%]	107		
Annual electricity consumption		$Q_{HE}$ [kWh]	7116		
Colder 55°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient	
	Outdoor air				
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)	
A	-7	5.63	2.17	0.900	
B	2	3.69	3.58	0.900	
C	7	2.86	5.58	0.966	
D	12	3.33	6.22	0.965	
TOL (E)	-22	3.53	1.42	0.900	
Tbivalent (F)	-7	5.63	2.17	0.900	
G	-15	4.34	1.71	0.900	

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA26I-1</b>
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Power consumption in modes other than "active mode"		
Off mode	$P_{OFF}$ [kW]	0.018
Thermostat off mode	$P_{TO}$ [kW]	0.017
Standby mode	$P_{SB}$ [kW]	0.018
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]	58
Rated airflow	[m <sup>3</sup> /h]	max. 3500

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

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA26I-1</b>
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<b>Information sheet</b>			
Temperature application		Low, 35°C	High, 55°C
Space heating energy efficiency class, Average climate	-	A++	A++
Nominal heating capacity Pdesign, Average climate	kW	7	6
Space heating seasonal efficiency, Average climate	%	168	126
Space heating annual electricity consumption, Average cl.	kWh	3139	4039

Nominal heating capacity Pdesign, Colder climate	kW	10	9
Space heating seasonal efficiency, Colder climate	%	132	107
Space heating annual electricity consumption, Colder cl.	kWh	5987	7116

Nominal heating capacity Pdesign, Warmer climate	kW	8	7
Space heating seasonal efficiency, Warmer climate	%	259	177
Space heating annual electricity consumption, Warmer cl.	kWh	1567	2199

Sound power level Lwa Outdoor	dBA	58
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<b>Information sheet for energy efficiency Set with Temperature controller</b>			
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	%	170	128
Set Space heating energy efficiency class, Average climate	-	A++	A++
Set Space heating seasonal efficiency, Colder climate	%	134	109
Set Space heating seasonal efficiency, Warmer climate	%	261	179

<b>Information sheet for energy efficiency Set with Temperature controller + Room Terminal</b>			
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	%	172	130
Set Space heating energy efficiency class, Average climate	-	A++	A++
Set Space heating seasonal efficiency, Colder climate	%	136	111
Set Space heating seasonal efficiency, Warmer climate	%	263	181

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA30I-1</b>
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Heat pump type	Air/Water
Supplementary heater	Yes
Heat pump combination heater	No

Reference heating season		<b>Average</b>		
Reference water temperature		<b>LOW, 35°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>7.64</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>187</b>	<b>A+++</b>	
Annual electricity consumption	<b><math>Q_{HE}</math> [kWh]</b>	<b>3326</b>		
<b>Average 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	6.76	2.80	0.900
B	2	4.35	4.52	0.900
C	7	2.82	6.91	0.900
D	12	3.46	8.54	0.958
TOL (E)	-10	6.23	2.64	0.900
Tbivalent (F)	-7	6.76	2.80	0.900

Reference heating season		<b>Average</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>7.14</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>141</b>	<b>A++</b>	
Annual electricity consumption	<b><math>Q_{HE}</math> [kWh]</b>	<b>4088</b>		
<b>Average 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	6.31	2.02	0.900
B	2	4.15	3.46	0.900
C	7	2.69	5.33	0.900
D	12	3.31	6.53	0.966
TOL (E)	-10	5.61	1.79	0.900
Tbivalent (F)	-7	6.31	2.02	0.900

Reference heating season		<b>Warmer</b>		
Reference water temperature		<b>Low, 35°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>9.04</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>270</b>		
Annual electricity consumption	<b><math>Q_{HE}</math> [kWh]</b>	<b>1771</b>		
<b>Warmer 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
B	2	9.04	3.49	0.900
C	7	5.83	5.83	0.900
D	12	2.61	8.85	0.900
TOL (E)	2	9.04	3.49	0.900
Tbivalent (F)	2	9.04	3.49	0.900

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA30I-1</b>
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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>8.41</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>185</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>2386</b>	
<b>Warmer 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cdh (-)
B	2	8.41	2.34	0.900
C	7	5.36	3.89	0.900
D	12	2.47	6.32	0.900
TOL (E)	2	8.41	2.34	0.900
Tbivalent (F)	2	8.41	2.34	0.900

Reference heating season		<b>Colder</b>		
Reference water temperature		<b>Low, 35°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>11.14</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>139.07</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>6587</b>	
<b>Colder 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cdh (-)
A	-7	6.74	1.00	2.943
B	2	4.10	1.00	4.831
C	7	2.64	1.00	7.116
D	12	1.17	0.45	8.536
TOL (E)	-22	11.14	1.00	2.128
Tbivalent (F)	-7	6.74	1.00	2.943
G	-15	9.09	1.00	2.430

Reference heating season		<b>Colder</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>10.94</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>114.12</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>7845</b>	
<b>Colder 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cdh (-)
A	-7	6.62	1.00	2.376
B	2	4.03	1.00	3.864
C	7	2.59	1.00	5.798
D	12	1.15	0.46	6.963
TOL (E)	-22	10.94	1.00	1.510
Tbivalent (F)	-7	6.62	1.00	2.376
G	-15	8.92	1.00	1.840

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA30I-1</b>
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Power consumption in modes other than "active mode"		
Off mode	$P_{OFF}$ [kW]	0.018
Thermostat off mode	$P_{TO}$ [kW]	0.017
Standby mode	$P_{SB}$ [kW]	0.018
Crankcaseheater mode	$P_{CK}$ [kW]	-

Supplementary heater capacity	$P_{SUP}$ [kW]	6(+6)
Supplementary heater type	[-]	electricity

Capacity control		Variable
Sound power level Indoor	$L_{WA}$ [dBA]	-
Sound power level Outdoor	$L_{WA}$ [dBA]	65
Rated airflow	[m <sup>3</sup> /h]	max.6000

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

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA30I-1</b>
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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	8	7
Space heating seasonal efficiency, Average climate	%	187	141
Space heating annual electricity consumption, Average cl.	kWh	3326	4088

Nominal heating capacity Pdesign, Colder climate	kW	11	11
Space heating seasonal efficiency, Colder climate	%	139	114
Space heating annual electricity consumption, Colder cl.	kWh	6587	7845

Nominal heating capacity Pdesign, Warmer climate	kW	9	8
Space heating seasonal efficiency, Warmer climate	%	270	185
Space heating annual electricity consumption, Warmer cl.	kWh	1771	2386

Sound power level Lwa Outdoor	dBA	65	
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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	%	189	143
Set Space heating energy efficiency class, Average climate	-	A+++	A++
Set Space heating seasonal efficiency, Colder climate	%	141	116
Set Space heating seasonal efficiency, Warmer climate	%	272	187

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	%	191	145
Set Space heating energy efficiency class, Average climate	-	A+++	A++
Set Space heating seasonal efficiency, Colder climate	%	143	118
Set Space heating seasonal efficiency, Warmer climate	%	274	189

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA371-1</b>
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Heat pump type	Air/Water
Supplementary heater	Yes
Heat pump combination heater	No

Reference heating season		<b>Average</b>		
Reference water temperature		<b>LOW, 35°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>10.93</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>176</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>5035</b>	
<b>Average 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	9.67	2.64	0.900
B	2	6.10	4.38	0.900
C	7	4.06	6.19	0.900
D	12	4.75	7.62	0.961
TOL (E)	-10	9.04	2.48	0.900
Tbivalent (F)	-7	9.67	2.64	0.900

Reference heating season		<b>Average</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>10.02</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>137</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>5910</b>	
<b>Average 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	8.86	2.00	0.900
B	2	5.45	3.41	0.900
C	7	3.48	4.94	0.900
D	12	4.08	6.01	0.965
TOL (E)	-10	8.22	1.85	0.900
Tbivalent (F)	-7	8.86	2.00	0.900

Reference heating season		<b>Warmer</b>		
Reference water temperature		<b>Low, 35°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>12.45</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>249</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>2645</b>	
<b>Warmer 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
B	2	12.45	3.33	0.900
C	7	8.12	5.54	0.900
D	12	3.58	7.87	0.900
TOL (E)	-10	12.45	3.33	0.900
Tbivalent (F)	-7	12.45	3.33	0.900

Heat pump model		Master Therm		BA371-1	
Reference heating season			Warmer		
Reference water temperature			High, 55°C		
Full load heating		Prated [kW]		11.14	
Seasonal efficiency		$\eta_s$ [%]		175	
Annual electricity consumption		$Q_{HE}$ [kWh]		3348	
Warmer 55°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient	
	Outdoor air				
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)	
B	2	11.14	2.28	0.900	
C	7	7.21	3.79	0.900	
D	12	4.51	5.84	0.969	
TOL (E)	-10	11.14	2.28	0.900	
Tbivalent (F)	-7	11.14	2.28	0.900	
Reference heating season			Colder		
Reference water temperature			Low, 35°C		
Full load heating		Prated [kW]		16.31	
Seasonal efficiency		$\eta_s$ [%]		135	
Annual electricity consumption		$Q_{HE}$ [kWh]		11678	
Colder 35°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient	
	Outdoor air				
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)	
A	-7	9.87	2.78	0.900	
B	2	6.18	4.67	0.900	
C	7	4.09	6.35	0.900	
D	12	4.75	7.62	0.961	
TOL (E)	-22	7.55	2.00	0.900	
Tbivalent (F)	-7	9.87	2.78	0.900	
G	-15	8.44	2.30	0.900	
Reference heating season			Colder		
Reference water temperature			High, 55°C		
Full load heating		Prated [kW]		15.21	
Seasonal efficiency		$\eta_s$ [%]		112	
Annual electricity consumption		$Q_{HE}$ [kWh]		12984	
Colder 55°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient	
	Outdoor air				
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)	
A	-7	9.20	2.27	0.900	
B	2	5.89	3.78	0.900	
C	7	3.93	5.32	0.900	
D	12	4.59	6.36	0.967	
TOL (E)	-22	6.95	1.64	0.900	
Tbivalent (F)	-7	9.20	2.27	0.900	
G	-15	7.82	1.89	0.900	

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA37I-1</b>
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Power consumption in modes other than "active mode"		
Off mode	$P_{OFF}$ [kW]	0.026
Thermostat off mode	$P_{TO}$ [kW]	0.024
Standby mode	$P_{SB}$ [kW]	0.026
Crankcaseheater mode	$P_{CK}$ [kW]	-

Supplementary heater capacity	$P_{SUP}$ [kW]	7.5(+7.5)
Supplementary heater type	[-]	electricity

Capacity control		Variable
Sound power level Indoor	$L_{WA}$ [dBA]	-
Sound power level Outdoor	$L_{WA}$ [dBA]	62
Rated airflow	[m <sup>3</sup> /h]	max.6000

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

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA371-1</b>
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<b>Information sheet</b>			
Temperature application		Low, 35°C	High, 55°C
Space heating energy efficiency class, Average climate	-	A+++	A++
Nominal heating capacity Pdesign, Average climate	kW	11	10
Space heating seasonal efficiency, Average climate	%	176	137
Space heating annual electricity consumption, Average cl.	kWh	5035	5910

Nominal heating capacity Pdesign, Colder climate	kW	16	15
Space heating seasonal efficiency, Colder climate	%	135	112
Space heating annual electricity consumption, Colder cl.	kWh	11678	12984

Nominal heating capacity Pdesign, Warmer climate	kW	12	11
Space heating seasonal efficiency, Warmer climate	%	249	175
Space heating annual electricity consumption, Warmer cl.	kWh	2645	3348

Sound power level Lwa Outdoor	dBA	62
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<b>Information sheet for energy efficiency Set with Temperature controller</b>			
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	%	178	139
Set Space heating energy efficiency class, Average climate	-	A+++	A++
Set Space heating seasonal efficiency, Colder climate	%	137	114
Set Space heating seasonal efficiency, Warmer climate	%	251	177

<b>Information sheet for energy efficiency Set with Temperature controller + Room Terminal</b>			
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	%	180	141
Set Space heating energy efficiency class, Average climate	-	A+++	A++
Set Space heating seasonal efficiency, Colder climate	%	139	116
Set Space heating seasonal efficiency, Warmer climate	%	253	179



<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA45I-1</b>
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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>13.11</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>172</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>3992</b>	
<b>Warmer 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
B	2	13.11	2.14	0.900
C	7	8.70	3.66	0.900
D	12	6.40	5.94	0.978
TOL (E)	2	13.11	2.14	0.900
Tbivalent (F)	2	13.11	2.14	0.900

Reference heating season		<b>Colder</b>		
Reference water temperature		<b>Low, 35°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>19.79</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>130</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>14639</b>	
<b>Colder 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	11.98	2.61	0.900
B	2	7.22	4.62	0.900
C	7	5.76	6.63	0.972
D	12	6.74	7.93	0.972
TOL (E)	-22	8.20	1.97	0.900
Tbivalent (F)	-7	11.98	2.61	0.900
G	-15	9.47	2.18	0.900

Reference heating season		<b>Colder</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>19.18</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>108</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>17082</b>	
<b>Colder 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	11.61	2.09	0.900
B	2	6.66	3.72	0.900
C	7	5.56	5.43	0.977
D	12	6.52	6.52	0.976
TOL (E)	-22	7.65	1.68	0.900
Tbivalent (F)	-7	11.61	2.09	0.900
G	-15	8.95	1.77	0.900

Heat pump model	Master Therm	BA45I-1
Power consumption in modes other than "active mode"		
Off mode	$P_{OFF}$ [kW]	0.026
Thermostat off mode	$P_{TO}$ [kW]	0.024
Standby mode	$P_{SB}$ [kW]	0.026
Crankcaseheater mode	$P_{CK}$ [kW]	-
Supplementary heater capacity		
Supplementary heater capacity	$P_{SUP}$ [kW]	7.5(+7.5)
Supplementary heater type	[-]	electricity
Capacity control		
Capacity control		Variable
Sound power level Indoor	$L_{WA}$ [dBA]	-
Sound power level Outdoor	$L_{WA}$ [dBA]	62
Rated airflow	[m <sup>3</sup> /h]	max.8000
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

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA45I-1</b>
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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	13	12
Space heating seasonal efficiency, Average climate	%	175	136
Space heating annual electricity consumption, Average cl.	kWh	6195	7166

Nominal heating capacity Pdesign, Colder climate	kW	20	19
Space heating seasonal efficiency, Colder climate	%	130	108
Space heating annual electricity consumption, Colder cl.	kWh	14639	17082

Nominal heating capacity Pdesign, Warmer climate	kW	16	13
Space heating seasonal efficiency, Warmer climate	%	251	172
Space heating annual electricity consumption, Warmer cl.	kWh	3326	3992

Sound power level Lwa Outdoor	dBA	62
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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	%	177	138
Set Space heating energy efficiency class, Average climate	-	A+++	A++
Set Space heating seasonal efficiency, Colder climate	%	132	110
Set Space heating seasonal efficiency, Warmer climate	%	253	174

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	%	179	140
Set Space heating energy efficiency class, Average climate	-	A+++	A++
Set Space heating seasonal efficiency, Colder climate	%	134	112
Set Space heating seasonal efficiency, Warmer climate	%	255	176

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA60I-1</b>
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Heat pump type	Air/Water
Supplementary heater	Yes
Heat pump combination heater	No

Reference heating season		<b>Average</b>		
Reference water temperature		<b>LOW, 35°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>22.57</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>177</b>	<b>A+++</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>10351</b>	
<b>Average 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	20.64	2.64	0.900
B	2	12.68	4.21	0.900
C	7	8.04	6.61	0.900
D	12	9.26	8.02	0.977
TOL (E)	-10	22.57	2.35	0.900
Tbivalent (F)	-10	22.57	2.35	0.900

Reference heating season		<b>Average</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>24.94</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>135</b>	<b>A++</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>14980</b>	
<b>Average 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	21.44	2.05	0.900
B	2	12.27	3.22	0.900
C	7	7.80	5.06	0.900
D	12	9.00	6.13	0.982
TOL (E)	-10	22.06	1.55	0.900
Tbivalent (F)	-7	22.06	1.55	0.900

Reference heating season		<b>Warmer</b>		
Reference water temperature		<b>Low, 35°C</b>		
Full load heating	<b>Prated [kW]</b>	<b>30.53</b>		
Seasonal efficiency	<b><math>\eta_s</math> [%]</b>	<b>248</b>		
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>6503</b>	
<b>Warmer 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pdh [kW]	COPd (-)	Cdh (-)
B	2	30.53	3.18	0.900
C	7	20.32	5.22	0.900
D	12	9.29	8.30	0.900
TOL (E)	2	30.53	3.18	0.900
Tbivalent (F)	2	30.53	3.18	0.900

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA60I-1</b>
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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>30.47</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>173</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>9259</b>	
<b>Warmer 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cdh (-)
B	2	30.47	2.27	0.900
C	7	20.53	3.57	0.900
D	12	8.97	5.93	0.900
TOL (E)	2	30.47	2.27	0.900
Tbivalent (F)	2	30.47	2.27	0.900

Reference heating season		<b>Colder</b>		
Reference water temperature		<b>Low, 35°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>32.27</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>141</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>22051</b>	
<b>Colder 35°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cdh (-)
A	-7	19.53	2.79	0.900
B	2	12.78	4.49	0.900
C	7	8.07	6.82	0.900
D	12	9.26	8.02	0.977
TOL (E)	-22	20.47	2.24	0.900
Tbivalent (F)	-7	19.53	2.79	0.900
G	-15	22.66	2.41	0.900

Reference heating season		<b>Colder</b>		
Reference water temperature		<b>High, 55°C</b>		
Full load heating		<b>Prated [kW]</b>	<b>31.21</b>	
Seasonal efficiency		<b><math>\eta_s</math> [%]</b>	<b>116</b>	
Annual electricity consumption		<b><math>Q_{HE}</math> [kWh]</b>	<b>25783</b>	
<b>Colder 55°C</b>	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	$T_j$ [°C]	Pd <sub>h</sub> [kW]	COP <sub>d</sub> (-)	Cdh (-)
A	-7	18.89	2.28	0.900
B	2	12.43	3.60	0.900
C	7	7.89	5.52	0.900
D	12	9.07	6.54	0.981
TOL (E)	-22	21.78	1.86	0.900
Tbivalent (F)	-7	18.89	2.28	0.900
G	-15	22.84	1.98	0.900

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA60I-1</b>
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Power consumption in modes other than "active mode"		
Off mode	$P_{OFF}$ [kW]	0.028
Thermostat off mode	$P_{TO}$ [kW]	0.027
Standby mode	$P_{SB}$ [kW]	0.028
Crankcaseheater mode	$P_{CK}$ [kW]	-

Supplementary heater capacity	$P_{SUP}$ [kW]	7.5(+7.5)
Supplementary heater type	[-]	electricity

Capacity control		Variable
Sound power level Indoor	$L_{WA}$ [dBA]	-
Sound power level Outdoor	$L_{WA}$ [dBA]	66
Rated airflow	[m <sup>3</sup> /h]	max.8000

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

<b>Heat pump model</b>	<b>Master Therm</b>	<b>BA60I-1</b>
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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	23	25
Space heating seasonal efficiency, Average climate	%	177	135
Space heating annual electricity consumption, Average cl.	kWh	10351	14980

Nominal heating capacity Pdesign, Colder climate	kW	32	31
Space heating seasonal efficiency, Colder climate	%	141	116
Space heating annual electricity consumption, Colder cl.	kWh	22051	25783

Nominal heating capacity Pdesign, Warmer climate	kW	31	30
Space heating seasonal efficiency, Warmer climate	%	248	173
Space heating annual electricity consumption, Warmer cl.	kWh	6503	9259

Sound power level Lwa Outdoor	dBA	66	
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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	%	179	137
Set Space heating energy efficiency class, Average climate	-	A+++	A++
Set Space heating seasonal efficiency, Colder climate	%	143	118
Set Space heating seasonal efficiency, Warmer climate	%	250	175

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	%	181	139
Set Space heating energy efficiency class, Average climate	-	A+++	A++
Set Space heating seasonal efficiency, Colder climate	%	145	120
Set Space heating seasonal efficiency, Warmer climate	%	252	177