Heat pump model	**Master Therm**	**BA45IS-1**

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

Reference heating season			**Average**	**SCOP**
Reference water temperature			**LOW, 35°C**	**4.46**
Full load heating		**Prated [kW]**	**13.37**	
Seasonal efficiency		**η_s [%]**	**176**	**A+++**
Annual electricity consumption		**Q_{HE} [kWh]**	**6190**	
Average 35°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	Tj [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	11.83	2.77	0.900
B	2	7.91	4.17	0.900
C	7	4.88	6.44	0.900
D	12	5.73	7.93	0.974
TOL (E)	-10	10.96	2.32	0.900
Tbivalent (F)	-7	11.83	2.77	0.900

Reference heating season			**Average**	**SCOP**
Reference water temperature			**High, 55°C**	**3.48**
Full load heating		**Prated [kW]**	**12.05**	
Seasonal efficiency		**η_s [%]**	**136**	**A++**
Annual electricity consumption		**Q_{HE} [kWh]**	**7160**	
Average 55°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	Tj [°C]	Pdh [kW]	COPd (-)	Cdh (-)
A	-7	10.66	2.10	0.900
B	2	6.82	3.28	0.900
C	7	4.38	5.00	0.900
D	12	4.83	6.13	0.976
TOL (E)	-10	9.57	1.77	0.900
Tbivalent (F)	-7	10.66	2.10	0.900

Reference heating season			**Warmer**	
Reference water temperature			**Low, 35°C**	
Full load heating		**Prated [kW]**	**15.78**	
Seasonal efficiency		**η_s [%]**	**251**	
Annual electricity consumption		**Q_{HE} [kWh]**	**3320**	
Warmer 35°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	Tj [°C]	Pdh [kW]	COPd (-)	Cdh (-)
B	2	15.78	3.03	0.900
C	7	9.77	5.50	0.900
D	12	5.09	8.20	0.969
TOL (E)	2	15.78	3.03	0.900
Tbivalent (F)	2	15.78	3.03	0.900

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Heat pump model	**Master Therm**	**BA45IS-1**

Reference heating season			**Warmer**	
Reference water temperature			**High, 55°C**	
Full load heating		**Prated [kW]**	**13.11**	
Seasonal efficiency		**η_s [%]**	**173**	
Annual electricity consumption		**Q_{HE} [kWh]**	**3983**	
Warmer 55°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	Tj [°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	0.982
TOL (E)	2	13.11	2.14	0.900
Tbivalent (F)	2	13.11	2.14	0.900

Reference heating season			**Colder**	
Reference water temperature			**Low, 35°C**	
Full load heating		**Prated [kW]**	**19.79**	
Seasonal efficiency		**η_s [%]**	**130**	
Annual electricity consumption		**Q_{HE} [kWh]**	**14633**	
Colder 35°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	Tj [°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	0.978
D	12	6.74	7.93	0.978
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			**Colder**	
Reference water temperature			**High, 55°C**	
Full load heating		**Prated [kW]**	**19.18**	
Seasonal efficiency		**η_s [%]**	**108**	
Annual electricity consumption		**Q_{HE} [kWh]**	**17077**	
Colder 55°C	Outdoor heat exchanger	Declared capacity	COP at part load	Degradation Coefficient
	Outdoor air			
	Tj [°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	0.981
D	12	6.52	6.52	0.981
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**	**BA45IS-1**

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]	7.5(+7.5)
Supplementary heater type	[-]	electricity

Capacity control		Variable
Sound power level Indoor	L_{WA} [dBA]	48
Sound power level Outdoor	L_{WA} [dBA]	62
Rated airflow	[m^3/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

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Heat pump model	**Master Therm**	**BA45IS-1**

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	%	176	136
Space heating annual electricity consumption, Average cl.	kWh	6190	7160
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	14633	17077
Nominal heating capacity Pdesign, Warmer climate	kW	16	13
Space heating seasonal efficiency, Warmer climate	%	251	173
Space heating annual electricity consumption, Warmer cl.	kWh	3320	3983
Sound power level Lwa Outdoor	dBA	62	

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	%	178	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	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	%	180	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	177

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