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Summary of	TTL 4.5 ICS, TTL 4.5 IKCS	Reg. No.	011-1W0225
Certificate Holder			
Name	tecalor GmbH		
Address	Fürstenbergerstr. 77	Zip	37603
City	Holzminden	Country	Germany
Certification Body	DIN CERTCO Gesellschaft für Konformitätsbewertung mbH		
Subtype title	TTL 4.5 ICS, TTL 4.5 IKCS		
Heat Pump Type	Outdoor Air/Water		
Refrigerant	R410A		
Mass of Refrigerant	2.2 kg		
Certification Date	03.04.2018		
Testing basis	HP KEYMARK certification scheme rules rev. no. 3		

Model: TTL 4.5 IKCS

Configure model	
Model name	TTL 4.5 IKCS
Application	Heating (medium temp)
Units	Indoor
Climate Zone	Colder Climate + Warmer Climate
Reversibility	No
Cooling mode application (optional)	n/a

General Data	
Power supply	1x230V 50Hz

Heating

EN 14511-2		
	Low temperature	**Medium temperature**
Heat output	2.06 kW	2.09 kW
El input	0.44 kW	0.81 kW
COP	4.68	2.59

EN 14511-4	
Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Starting and operating test	passed

Average Climate

EN 12102-1		
	Low temperature	**Medium temperature**
Sound power level indoor	45 dB(A)	45 dB(A)

EN 14825		
	Low temperature	**Medium temperature**
η_s	175 %	128 %
Prated	4.70 kW	4.50 kW
SCOP	4.46	3.28
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	4.17 kW	3.94 kW
COP Tj = -7°C	3.09	2.22
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	2.86 kW	2.54 kW
COP Tj = +2°C	4.29	3.10
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	2.08 kW	2.04 kW
COP Tj = +7°C	6.24	4.53
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	2.02 kW	1.97 kW

COP Tj = 12°C	8.31	6.44
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	4.17 kW	3.94 kW
COP Tj = Tbiv	3.09	2.22
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	4.06 kW	2.96 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.71	1.94
WTOL	60 °C	60 °C
Poff	56 W	56 W
PTO	21 W	21 W
PSB	56 W	56 W
PCK	26 W	26 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.64 kW	1.54 kW
Annual energy consumption Qhe	2187 kWh	2837 kWh

Warmer Climate

EN 14825		
	Low temperature	**Medium temperature**
η_s	198 %	136 %
Prated	2.62 kW	2.40 kW
SCOP	5.01	3.47

Tbiv	2 °C	2 °C
TOL	2 °C	2 °C
Pdh Tj = +2°C	2.62 kW	2.37 kW
COP Tj = +2°C	3.76	2.28
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	2.07 kW	1.84 kW
COP Tj = +7°C	5.19	3.35
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	2.00 kW	1.94 kW
COP Tj = 12°C	7.92	5.39
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	2.62 kW	2.37 kW
COP Tj = Tbiv	3.76	2.28
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	2.62 kW	2.37 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	3.76	2.28
WTOL	60 °C	60 °C
Poff	56 W	56 W
PTO	21 W	21 W
PSB	56 W	56 W
PCK	26 W	26 W
Supplementary Heater: Type of energy input	Electricity	Electricity

Supplementary Heater: PSUP	0.00 kW	0.03 kW
Annual energy consumption Qhe	698 kWh	923 kWh

Colder Climate

EN 14825		
	Low temperature	**Medium temperature**
η_s	150 %	116 %
Prated	6.80 kW	6.70 kW
SCOP	3.83	2.98
Tbiv	-7 °C	-7 °C
TOL	-20 °C	-20 °C
Pdh Tj = -7°C	4.11 kW	4.05 kW
COP Tj = -7°C	3.37	2.57
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	3.01 kW	2.60 kW
COP Tj = +2°C	5.17	3.55
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	2.09 kW	2.07 kW
COP Tj = +7°C	7.26	5.31
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	2.02 kW	1.99 kW

COP Tj = 12°C	8.96	7.11
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	4.11 kW	4.05 kW
COP Tj = Tbiv	3.37	2.57
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	2.35 kW	6.00 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.99	1.00
WTOL	60 °C	60 °C
Poff	56 W	56 W
PTO	21 W	21 W
PSB	56 W	56 W
PCK	26 W	26 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	3.45 kW	3.50 kW
Annual energy consumption Qhe	4382 kWh	5547 kWh
Pdh Tj = -15°C (if TOL<-20°C)	4.11	4.05
COP Tj = -15°C (if TOL<-20°C)	3.37	2.57
Cdh Tj = -15 °C	0.90	0.90

Model: TTL 4.5 ICS

Configure model	
Model name	TTL 4.5 ICS
Application	Heating (medium temp)
Units	Indoor
Climate Zone	Colder Climate + Warmer Climate
Reversibility	No
Cooling mode application (optional)	n/a

General Data	
Power supply	1x230V 50Hz

Heating

EN 14511-2		
	Low temperature	**Medium temperature**
Heat output	2.06 kW	2.10 kW
El input	0.44 kW	0.80 kW
COP	4.68	2.64

EN 14511-4	
Shutting off the heat transfer medium flow	passed
Complete power supply failure	passed
Starting and operating test	passed

Average Climate

EN 12102-1		
	Low temperature	**Medium temperature**
Sound power level indoor	45 dB(A)	45 dB(A)

EN 14825		
	Low temperature	**Medium temperature**
η_s	178 %	130 %
Prated	4.80 kW	4.50 kW
SCOP	4.53	3.32
Tbiv	-7 °C	-7 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	4.22 kW	3.98 kW
COP Tj = -7°C	3.22	2.27
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	2.88 kW	2.55 kW
COP Tj = +2°C	4.33	3.16
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	2.08 kW	2.04 kW
COP Tj = +7°C	6.28	4.53
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	2.02 kW	1.97 kW

COP Tj = 12°C	8.35	6.44
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	4.22 kW	3.98 kW
COP Tj = Tbiv	3.22	2.27
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	4.11 kW	3.79 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	2.84	1.85
WTOL	60 °C	60 °C
Poff	56 W	56 W
PTO	21 W	21 W
PSB	56 W	56 W
PCK	26 W	26 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.69 kW	0.71 kW
Annual energy consumption Qhe	2187 kWh	2804 kWh

Warmer Climate

EN 14825		
	Low temperature	**Medium temperature**
η_s	198 %	136 %
Prated	2.64 kW	2.40 kW
SCOP	5.03	3.48

Tbiv	2 °C	2 °C
TOL	2 °C	2 °C
Pdh Tj = +2°C	2.64 kW	2.39 kW
COP Tj = +2°C	3.83	2.33
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	2.07 kW	1.84 kW
COP Tj = +7°C	5.19	3.35
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	2.00 kW	1.94 kW
COP Tj = 12°C	7.92	5.39
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	2.64 kW	2.39 kW
COP Tj = Tbiv	3.83	2.33
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	2.64 kW	2.39 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	3.83	2.33
WTOL	60 °C	60 °C
Poff	56 W	56 W
PTO	21 W	21 W
PSB	56 W	56 W
PCK	26 W	26 W
Supplementary Heater: Type of energy input	Electricity	Electricity

Supplementary Heater: PSUP	0.00 kW	0.01 kW
Annual energy consumption Qhe	70 kWh	921 kWh

Colder Climate

EN 14825		
	Low temperature	**Medium temperature**
η_s	155 %	119 %
Prated	6.90 kW	6.80 kW
SCOP	3.94	3.04
Tbiv	-7 °C	-7 °C
TOL	-20 °C	-20 °C
Pdh Tj = -7°C	4.16 kW	4.10 kW
COP Tj = -7°C	3.48	2.63
Cdh Tj = -7 °C	0.90	0.90
Pdh Tj = +2°C	3.03 kW	2.62 kW
COP Tj = +2°C	5.34	3.64
Cdh Tj = +2 °C	0.90	0.90
Pdh Tj = +7°C	2.09 kW	2.07 kW
COP Tj = +7°C	7.26	5.31
Cdh Tj = +7 °C	0.90	0.90
Pdh Tj = 12°C	2.02 kW	1.99 kW

COP Tj = 12°C	8.96	7.11
Cdh Tj = +12 °C	0.90	0.90
Pdh Tj = Tbiv	4.16 kW	4.10 kW
COP Tj = Tbiv	3.48	2.63
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	5.00 kW	3.16 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	1.00	2.50
WTOL	60 °C	60 °C
Poff	56 W	56 W
PTO	21 W	21 W
PSB	56 W	56 W
PCK	26 W	26 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.54 kW	3.28 kW
Annual energy consumption Qhe	4321 kWh	5515 kWh
Pdh Tj = -15°C (if TOL<-20°C)	4.16	4.10
COP Tj = -15°C (if TOL<-20°C)	3.48	2.63
Cdh Tj = -15 °C	0.90	0.90