

MCAE

Air cooled water chillers
Air cooled reversible heat pumps
from 19 kW to 40 kW



SCROLL compressor R 407C



according to
97/23/CE
n° 1131



ISO 9001
FM 534490

Series:	MCAE	Leaflet:	DE 81
Issue:	09/08	Supersedes :	03/08

MCAE air cooled water chillers with scroll compressors MCAE...H air cooled reversible heat pumps

General features

FRAME

Self-supporting galvanized steel frame protected with polyester powder painting. Panels are easily removable for maintenance and service activities.

COMPRESSORS

Hermetic "scroll" type with overload protection by a klixon and complete with oil sight glass. They are installed on vibrations absorbing rubber and placed within a closed compartment to reduce sound level and to allow service and maintenance activities while unit is in operation.

EVAPORATOR

Brazewelded plate type. The circuits are made to guarantee an homogeneous cooling of all the water flow even during partial load. The insulation is made of flexible closed-cells lining. It is advisable to fit a differential pressure switch which will stop the unit in case there is no water circulation on the plate to plate evaporator.

CONDENSER

Copper tube and aluminium finned coil. As option a protection grid is available.

FANS

Axial fans with aerodynamic outline blade section made of Al/Mg, directly coupled to a single-phase electric motor with external rotor. A safety fan guard is fitted on air flow discharge.

REFRIGERANT CIRCUIT

Each unit is supplied with: filter dryer, sight glass, thermostatic expansion valve, service valve.

To protect the refrigerant circuit the following devices are installed: manual reset high pressure switch and automatic reset low pressure switch, antifreeze thermostat.

The heat pump units version (MCAE...H) contain, in addition: crankcase heater, safety thermostat on compressor discharge line, 4-ways valve, check valve, solenoid valve, liquid receiver.

ELECTRICAL BOARD

Weather proof type with protection grade IP54 installed in the compressor box to enable service and maintenance activities while unit is in operation.

It Includes:

- Main circuit automatic breaker with locking door device, main fuses, compressor contactor, fans fuses and contactors, auxiliary circuits trafo. Microprocessor to control automatically the unit with a visual system to display the function as well as failures.

Versions

DS

Partial condensing heat recovery. It includes a desuperheater insulated and installed in series between the compressor and the condenser.

RCS - RCP

On request.

P

Hydraulic kit version. It includes: one pump, expansion vessel, safety valve, hydraulic circuit insulated and flowswitch. Relevant electrical circuit. As option, pumps with higher ESP are available.

PAC

Version with hydraulic kit and storage tank. It includes, further to what included in the P version, a storage tank installed on the return line.

LN

Low noise version, it includes: pressostatic fan speed control, compressor insulated with a high sound absorbing layer.

VLN

On request.

Options

- Fans speed regulator.
- Cu/Cu condensing coils.
- Coils protection grid.
- Flowswitch (standard mounted on P and PAC versions).
- Water pumps with higher ESP.
- Compressor suction and discharge shut-off valves.
- Gauges with shut-off valves.
- Programmer clock.
- Remote control panel.
- Evaporator electric heater.
- Evaporator electric heater for PAC version.
- Rubber antivibrators.
- Wooden crate packing.

MCAE technical data

SIZE		21/1	25/1	30/1	40/1	45/1
COOLING MODE MCAE						
Cooling capacity (1)	kW	19,8	22,7	27,6	32,7	40
Abs. Power (2)	kW	6,5	8,3	8,5	11,4	13,5
HEATING MODE MCAE...H						
Heating capacity (1)	kW	21	25	29	37	43
Abs. Power (2)	kW	7	8,8	10,5	13	15
Compressors (scroll type)						
Quantity	n°	1				
Refrigerant circuits	n°	1				
Capacity steps	n°	1				
Refrigerant		R407C				
Evaporator plate-to-plate type (3)						
Water flow	m ³ /h	3,2	3,7	4,5	5,3	6,5
Pressure drop	kPa	16	21	26	28	30
Water volume	l	0,7	0,8	1	1,3	1,5
Water connections	Ø	1¼	1¼	1¼	1¼	1¼
Condenser (STD/LN version) (4)						
Axial fans	n°	1	1	2	2	2
Nominal air flow (5)	m ³ /s	2,1	2,1	4,7	4,7	4,2
Max abs. power	kW	0,5	0,5	0,5	0,5	0,5
Max abs. current	A	2,5	2,5	2,5	2,5	2,5
Condenser (VLN version)						
Axial fans	n°	(9)				
Nominal air flow	m ³ /s					
Max abs. power	kW					
Max abs. current	A					
Unit electrical data (6)						
Max abs. current	A	18	21	23	28	33
LRC	A	100	124	128	168	199
Electrical supply	V/f/Hz	400/3+N/50				
PAC version						
Storage tank water volume	l	100	100	100	100	100
Water pump nominal power	kW	0,55	0,55	0,55	0,55	0,55
Water pump nominal current	A	1,7	1,7	1,7	1,7	1,7
ESP	kPa	130	130	130	130	130
DS version (7)						
Heating capacity	kW	5	5	6	8	9
Water flow	m ³ /h	0,7	0,7	1	1,4	1,6
Pressure drop	kPa	20	20	20	20	20
Sound pressure level at 1 m (6) (8)						
STD version	dB(A)	58	58	61	61	61
LN version	dB(A)	55	55	58	58	58
VLN version	dB(A)	(9)				

Note:

- 1)Cooling mode: water temperature 12/7°C; air temperature 35°C;
Heating mode : water temperature 40/45°C; air temperature 7°C db, 6°C wb.
- 2)Compressors + fans only. No water pump.
- 3)It becomes condenser in MCAE...H (heat pump) version.
- 4)It becomes evaporator in MCAE...H (heat pump) version.

- 5)Max. air flow in case of LN version.
- 6)Without water pump.
- 7)Water temperature from 40°C to 50°C.
- 8)Compressors site and according to ISO 3744.
- 9)Available on request.

MCAE R 407C : PRESTAZIONI

COOLING CAPACITY AND ABSORBER POWER

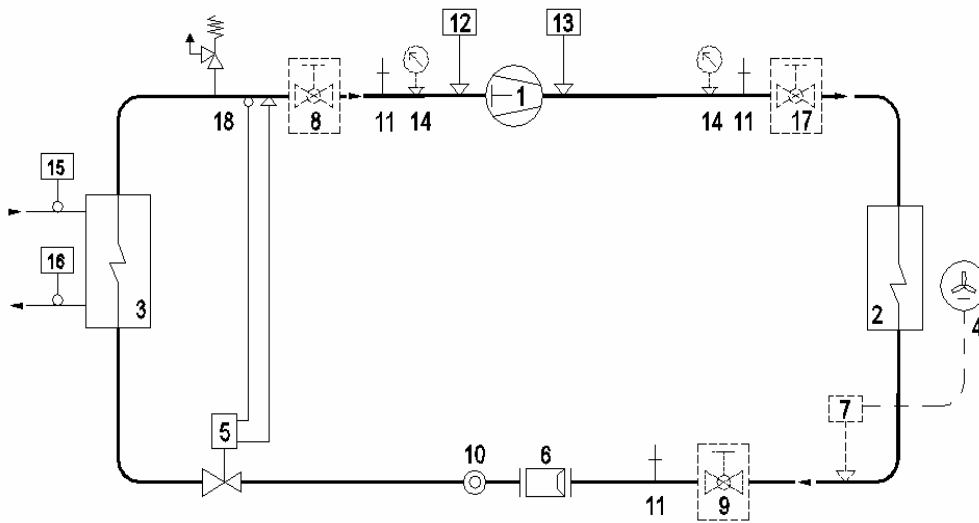
MOD.	EVAP.	CONDENSER Ambient air temperature °C													
	Tw °C out.	26		29		32		35		38		41		44	
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa
21/1	5	21	5,0	20	5,5	19	6,0	18	6,4	18	6,9	17	7,5	16	8,0
	6	21	5,1	21	5,5	20	6,0	19	6,4	18	7,0	18	7,5	17	8,1
	7	22	5,1	21	5,6	21	6,0	19,8	6,5	19	7,0	18	7,6	18	8,1
	8	23	5,2	22	5,6	21	6,1	20	6,6	20	7,1	19	7,7	18	8,2
	9	24	5,2	23	5,7	22	6,2	21	6,6	20	7,2	20	7,7	19	8,3
	10	24	5,3	23	5,7	23	6,2	22	6,7	21	7,3	20	7,8	19	8,3
25/1	5	24	6,4	23	7,0	22	7,6	21	8,2	20	8,8	20	9,5	19	10,2
	6	25	6,5	24	7,1	23	7,7	22	8,2	21	8,9	20	9,6	19	10,3
	7	25	6,6	24	7,2	24	7,7	22,7	8,3	22	9,0	21	9,7	20	10,4
	8	26	6,6	25	7,2	24	7,8	23	8,4	23	9,1	22	9,8	21	10,5
	9	27	6,7	26	7,3	25	7,9	24	8,5	23	9,2	22	9,9	22	10,6
	10	28	6,7	27	7,3	26	7,9	25	8,6	24	9,3	23	10,0	22	10,7
30/1	5	29	6,6	28	7,2	27	7,8	26	8,4	25	9,1	24	9,8	23	10,5
	6	30	6,7	29	7,3	28	7,8	27	8,4	26	9,1	25	9,9	24	10,6
	7	31	6,7	30	7,3	29	7,9	27,6	8,5	27	9,2	25	9,9	25	10,7
	8	32	6,8	31	7,4	30	8,0	29	8,6	27	9,3	26	10,0	25	10,7
	9	33	6,8	32	7,4	31	8,0	29	8,7	28	9,4	27	10,1	26	10,8
	10	34	6,9	33	7,5	32	8,1	30	8,8	29	9,5	28	10,2	27	10,9
40/1	5	34	8,9	33	9,6	32	10,4	30	11,2	29	12,2	28	13,1	27	14,0
	6	35	8,9	34	9,7	33	10,5	32	11,3	30	12,3	29	13,2	28	14,2
	7	37	9,0	35	9,8	34	10,6	32,7	11,4	31	12,4	30	13,3	29	14,3
	8	38	9,1	36	9,9	35	10,7	34	11,5	33	12,5	31	13,4	30	14,4
	9	39	9,1	38	10,0	36	10,8	35	11,6	34	12,6	32	13,6	31	14,5
	10	40	9,2	39	10,0	37	10,9	36	11,7	35	12,7	33	13,7	32	14,6
45/1	5	42	10,5	40	11,4	39	12,4	37	13,3	36	14,4	35	15,5	33	16,6
	6	43	10,6	42	11,5	40	12,5	39	13,4	37	14,5	36	15,6	34	16,8
	7	45	10,7	43	11,6	42	12,6	40,0	13,5	39	14,6	37	15,8	36	16,9
	8	46	10,8	45	11,7	43	12,7	41	13,6	40	14,8	38	15,9	37	17,1
	9	48	10,8	46	11,8	44	12,8	43	13,8	41	14,9	40	16,1	38	17,2
	10	49	10,9	47	11,9	46	12,9	44	13,9	42	15,1	41	16,2	39	17,3

Tw - Outlet water temperature evaporator (delta T 5°C)

kWf - Cooling capacity

kWa - Abs. power

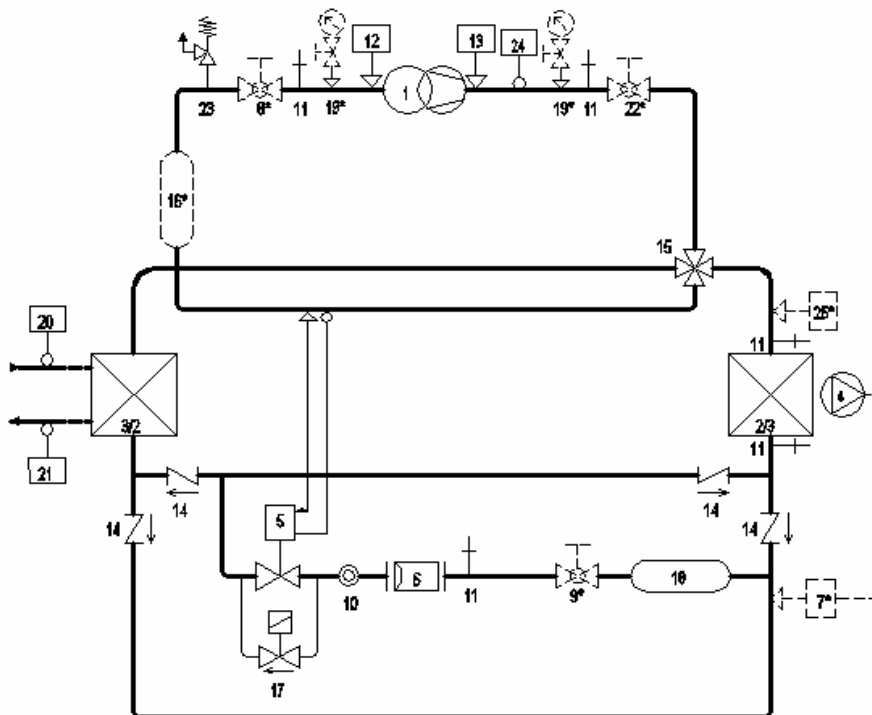
Refrigerant Circuit MCAE



- 1 = Compressor
- 2 = Condensator
- 3 = Evaporator
- 4 = Fan
- 5 = Thermal expansion valve
- 6 = Refrigerant filter
- 7 = Fan speeregulator**
- 8 = Suction line valve**
- 9 = Liquid line cock**
- 10 = Humidity indicator
- 11 = Schrader service valve
- 12 = Low pressure switch
- 13 = High pressure switch
- 14 = Gauge**
- 15 = Temperature probe
- 16 = Probe antifreeze
- 17 = Supply cock**
- 18 = Relief valve

** The outlined components are optional

Refrigerant Circuit MCAE....H

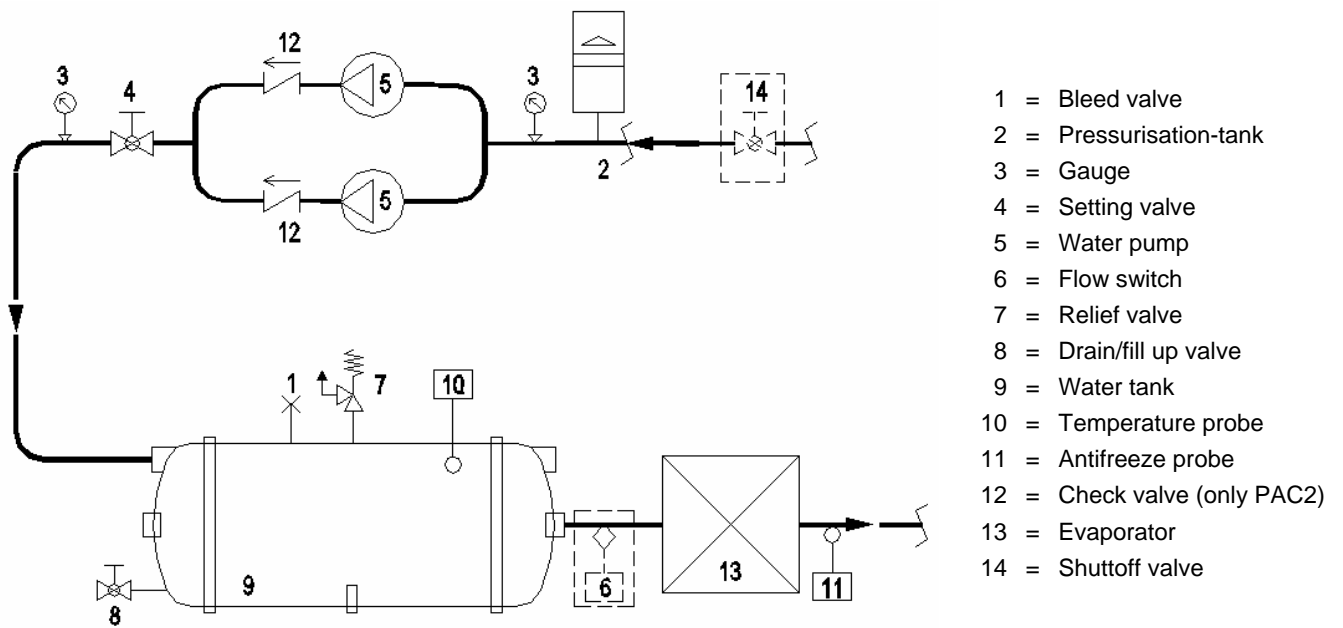


- 1 = Compressor
- 2 = Outdoor exchanger
- 3 = Indoor exchanger
- 4 = Fan
- 5 = Thermal expansion valve
- 6 = Refrigerant filter
- 7 = Fan speedregulator **
- 8 = Suction line valve **
- 9 = Liquid line cock**
- 10 = Humidity indicator
- 11 = Schrader service valve
- 12 = Low pressure switch
- 13 = High pressure switch
- 14 = check valve
- 15 = 4way solenoid valve
- 16 = suction separator **
- 17 = solenoid valve
- 18 = liquid receiver
- 19 = Gauge**
- 20 = Temperature probe
- 21 = Probe antifreeze
- 22 = Supply cock**
- 23 = Relief valve
- 24 = Temperature probe
- 25 = Pressure probe

** The outlined components are optional

Hydraulic Circuit MCAE... . PAC 1

PAC : n° 1 off pump



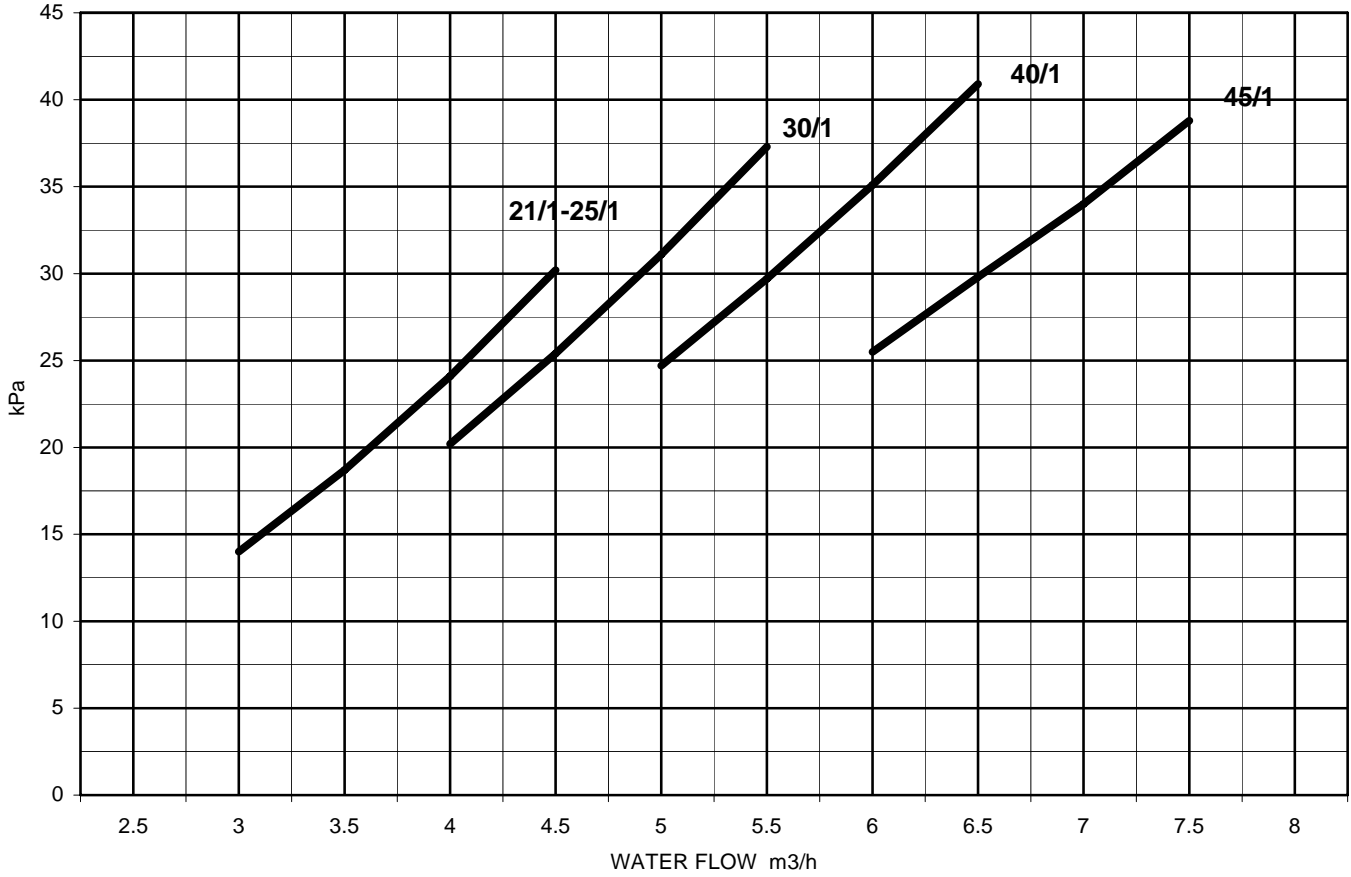
Operatine range

Raffreddamento Riscaldamento

INLET WATER TEMP. EVAPORATOR	Max °C	17	45
	Min °C	9	30
OUTLET WATER TEMO. EVAPORATOR	Max °C	10	50
	Min °C	5	35
EXETERNAL AIR TEMPERATURE	Max °C	46	20
	Min °C	15 (1)	-5

(1) this value can go down to -15 °C only if the appropriate kit has been installed

SHELL AND TUBE EVAPORATOR PRESSURE DROP FROM MOD.21/1 TO MOD.45/1

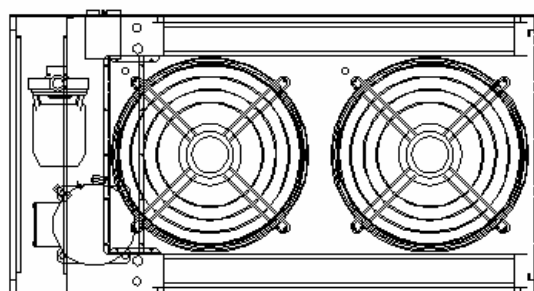
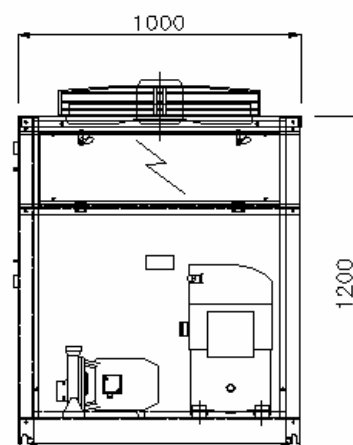
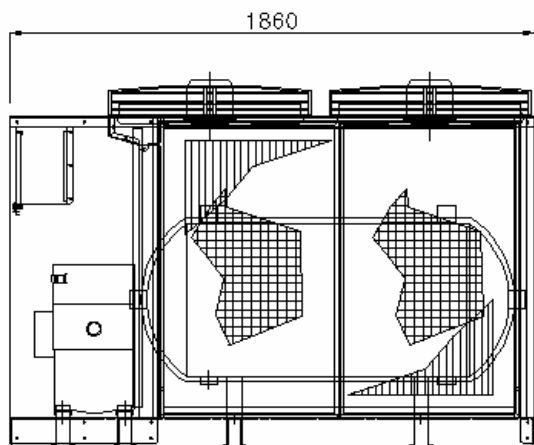


CAPACITY AND POWER CORRECTION FACTORS

Ambient air temperature	°C	26	29	32	35	38	41	44
Cooling capacity	Kf1	1,147	1,097	1,048	1,000	0,942	0,885	0,827
Compressors abs. power	Ka1	0,836	0,89	0,945	1,000	1,064	1,128	1,192
Outlet water temp.	°C	5	6	7	8	9	10	11
Cooling capacity	Kf2	0,941	0,97	1,000	1,032	1,063	1,095	1,125
Compressors abs. power	Ka2	0,976	0,988	1,000	1,010	1,020	1,029	1,037

CORRECTION FACTORS

Ethylene glycol percentage by weight (%)	10	20	30	40	50
Freezing point (°C)	-3,6	-8,7	-15,3	-23,5	-35,5
Cooling capacity	0,986	0,980	0,973	0,966	0,960
Power input	1,000	0,995	0,990	0,985	0,975
Mixture flow	1,023	1,054	1,092	1,140	1,200
Pressure drop	1,061	1,114	1,190	1,244	1,310



WEIGHTS (kg)

VERSIONS	STD					LN					
	21/1	25/1	30/1	40/1	45/1	21/1	25/1	30/1	40/1	45/1	
Operation (1)	420	435	450	460	520	430	445	460	470	530	
Transport	420	435	450	460	520	430	445	460	470	530	
“P” Version											
Operation (1)	440	455	470	480	540	450	465	480	490	550	
Transport	440	455	470	480	540	450	465	480	490	550	
“PAC” Version											
Operation	640	655	670	680	740	650	665	680	690	750	
Transport	490	505	520	530	590	500	515	530	540	600	

(1) The data has to be added to the evaporator water volume with regard to the selected model.

Technical data shown in this booklet are not binding. ACM Kälte Klima Srl reserves the right to modify data without any prior notices