

FREE COOLING

Air cooled liquid chiller

Free-Cooling from 40 kW to 365 kW



SCROLL compressor R 407C



according to
97/23/CE
n° 1131



ISO 9001
FM 534490

Serie:	SCAE-FC	Leaflet:	DE 90
Issue:	09/08	Supersedes:	03/08

Identification code

Index

SCAE - 111 - FC		
1	2	3 4 5 6 7 8 9
1	S	Small series < 360 kW
2	C	Chiller unit
3	A	Air cooled
4	E	Axial fans
5	-	Refrigerant R407C
	X	Refrigerant R134a
6	11	Power factor
7	1	Number of circuits
8	-	Cooling only version
9	FC	Free-Cooling
	PAC	Storage tank + Pump
	P1	1 pump
	P2	2 pumps
	RCP	Heat recovery fitted in parallel (100%)
	LN	Low noise

Pag. 2	Identification code
Pag. 3	Working schema
Pag. 4	General feature and available versions
Pag. 5	Working conditions – Operating range – Hydraulic circuit
Pag. 6	Technical data from mod. 51 to 151
Pag. 7	Cooling capacity and absorbed power from mod. 51 to 151
Pag. 8	Technical data from mod. 181 to 352
Pag. 9	Cooling capacity and absorbed power from mod. 181 to 352
Pag. 10	Dimensions / weight from mod. 51 to 81
Pag. 11	Dimensions / weight from mod. 91 to 181
Pag. 12	Dimensions / weight from mod. 212 to 352

GENERAL FEATURES

The SCAE/FC free-cooling units are particularly suitable where chilled water all year long is required, so also by low ambient air temperature. The free-cooling system utilises the low outside temperature for chilling water in the coil starting from 15 °C ambient air temperature.

THE FREE-COOLING PRINCIPLE

The units series SCAE/FC are designed to cool down water/glycol fluid.

This units are equipped, further to the chiller components such as compressors, condensers, evaporator, thermostatic valves, with a water free-cooling coil. The control system consists of a modulating three-way valve and of a certain number of probes allowing the water coil functioning and therefore the "free-cooling" operation. In the standard chiller the return water/glycol fluid is cooled down through the shell and tube evaporator. In the SCAE/FC units working in free-cooling mode, the water/glycol fluid runs through the free-cooling coil which is cooled by means of the external air, thus reducing the load on the compressors or even completely substituting them. The control system consists of a microprocessor, an inlet water temperature probe, an external air temperature probe, a working probe and a no-freezing probe.

OPERATION IN SUMMER

When the ambient air temperature is higher than the return water/glycol temperature the cooling capacity is guaranteed by the compressors (10); the 3-way valve (9) allows the water/glycol to go into the evaporator (12); the free-cooling coil (11) is not working. The absorbed power is the same as a traditional electric air cooled chiller.

OPERATION IN WINTER

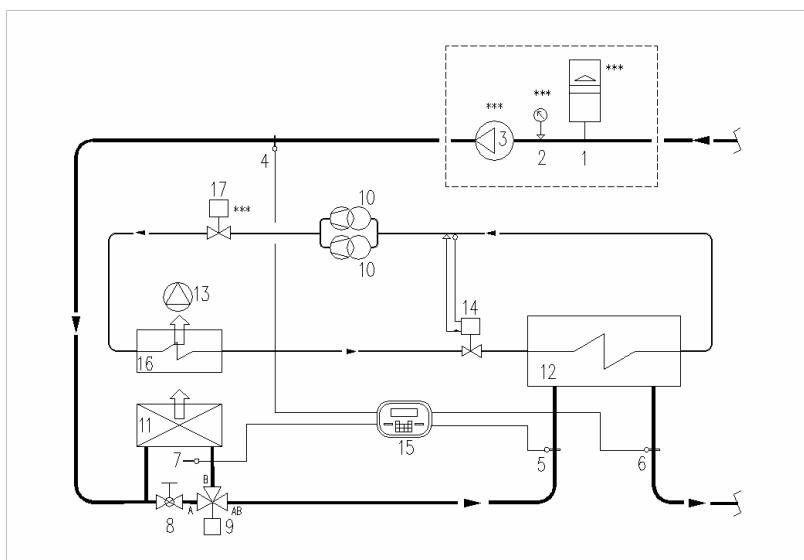
When the ambient air temperature is lower 3-0 °C, the chiller operates in free cooling mode: the 3-way valve (9) allows the water/glycol to go into the free-cooling coil (11), the probe (5) switch off the compressors (10). The fans (13) keep working to guarantee the air flow through the free-cooling coil (11). By the external air decreasing, the microprocessor (15) activates the 3-way valve (9) to mix the free-cooling water with the return water from the plant. By reaching the set point the fans switch off.

OPERATION IN MID SEASON

It's a combination of free-cooling and traditional electric chiller. The free-cooling operation starts when the external air temperature is at least 1,5 °C lower than the return liquid temperature; so, normally at 15-10 °C. The liquid is pre-cooled in the free-cooling coil (11). The performance is completed by the compressors. The water temperature probe (5) controls the compressor (10) capacity steps.

BENEFITS

- ✓ Your overheads would reduce in the mid season.
- ✓ Your free cooling system could run automatically when required.
- ✓ There would be less wear and tear due to the reduced hours of operation.
- ✓ Your maintenance costs would reduce.



- 1 = Expansion vessel
- 2 = Gauge
- 3 = Pump
- 4 = Inlet water probe
- 5 = Probe
- 6 = Antifreeze probe
- 7 = External air temperature
- 8 = Shut-off valve
- 9 = 3-way valve
- 10 = Compressor
- 11 = Free-cooling coil
- 12 = Evaporator
- 13 = Fan
- 14 = Thermostatic valve
- 15 = Microprocessor
- 16 = Condenser
- 17 = Compressor pressure control valve
- *** = Options

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 vibration 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

Braze-welded plate type with one or two independent refrigerant circuits and one water circuit.

The circuit 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.

As protection, a differential pressure switch is mounted to stop the unit in case of no water circulation.

As option, a shell and tube evaporator type is available.

CONDENSER / FREE-COOLING

Condenser: one or two condensers made of copper tubes and aluminium finned coils.

Water free-cooling coil: one or two coils made of copper tubes and aluminium finned coils.

FANS

Axial fans with aerodynamic outline blade section directly coupled to a three phase electric motor with external rotor.

A safety fan guard is fitted on air flow discharge.

REFRIGERANT CIRCUIT

Each unit is supplied with one or two independent refrigerant circuits; each one includes: filter drier, sight glass, thermostatic expansion valve, service valve.

To protect the refrigerant circuit the following devices are installed: man. reset HP-switch, aut. reset LP-switch and anti-freeze thermostat. Besides, only from mod. 131 to 352, man. reset safety pressure switch and safety valve.

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, auxiliary circuits trafo.

Microprocessor to control automatically the unit with a visual system to display the function as well as failures.

Versions

RCP

100% condensing heat recovery. Each refrigerant circuit includes: a heat exchanger insulated and mounted in parallel to the condenser. Moreover the relevant solenoid valves.

P

Hydraulic kit version. It includes: one or two pumps (one as stand-by pump), expansion vessel, safety valve, air purger, hydraulic circuit insulated and with flowswitch, shut-off valves and, in case of stand-by pump, non-return pump. Relevant electrical circuit. As option, pumps with higher ESP are available.

PAC

Version with hydraulic and inertial 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 fan speed control and special soundproofing for the compressors chamber.

Options

- Power factor correction.
- Cu/Cu condensing coils.
- Protection grid on the coils
- Flowswitch (STD on P and PAC versions)
- Pumps with higher ESP.
- Compressor shut-off valves.
- HP/LP gauges with shut-off valves.
- Programmer clock.
- Remote control panel.
- Rubber antiv. mountings.
- Shell and tube evaporator.

WORKING CONDITIONS

The technical data are referred to the following working conditions :

SUMMER OPERATION

- ✓ Inlet water temperature +16°C
- ✓ Outlet water temperature +10°C
- ✓ Ambient air temperature +32°C

FREE-COOLING OPERATION

- ✓ Inlet water temperature +16°C
- ✓ Outlet water temperature +10°C

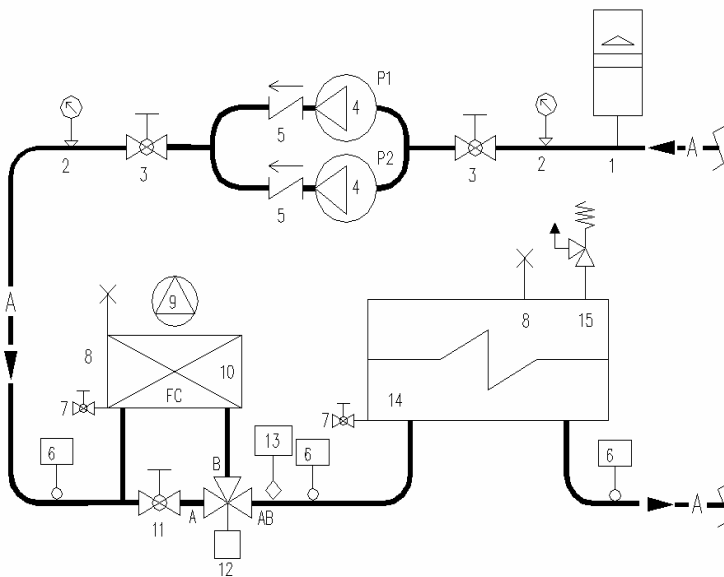
SOUND PRESSURE LEVEL

Free field sound pressure level taken at 1 m from the unit and 1,5 m from its base, compressors side and full operating unit. The sound pressure level may change according to the various installation and has a + / - 3 dB(A) tolerance according to ISO3744.

The electrical power supply is 400V/3Ph/50Hz; the auxiliary electrical supply is 230V/1Ph/50Hz.

(OPTION)

Hydraulic circuit SCAE/ FC... . . PAC 2 (PAC 1)



- 1 = Expansion vessel
- 2 = Gauge
- 3 = Shut-off valve
- 4 = Pump
- 5 = Non-return valve
- 6 = Temperature probe
- 7 = Drain/fill up valve
- 8 = Bleed valve
- 9 = Fan
- 10 = Free-cooling coil
- 11 = Shut-off valve
- 12 = 3 way valve
- 13 = Flowswitch
- 14 = Tank
- 15 = Safety valve

Operating range

INLET WATER TEMPERATURE	Max °C	25
	Min °C	10
OUTLET WATER TEMPERATURE	Max °C	18
	Min °C	5
AMBIENT AIR TEMPERATURE	Max °C	42
	Min °C	-15

Technical data FREE-COOLING

SIZE		51	61	81	91	111	131	151
COOLING MODE								
Nominal cooling capacity (1)	kW	47	57	68	89	99	112	137
Abs. power (2)	kW	18,6	20,4	26,3	28,9	34,7	39,3	52,2
Free-cooling								
Amb. temp. (50% FC-capacity)	°C	9.5	8.2	7	8.2	7.5	7.2	7.3
Amb. temp. (100% FC-capacity)	°C	2.9	0.3	-2.1	0.2	-1.1	-1.7	-1.1
Ab. power (3)	kW	2.2	2.2	2.2	3.3	3.3	3.3	6.6
Compressor (scroll)								
Quantity	n°	2						
Refrigerant circuit	n°	1						
Capacity steps	n°	2						
Refrigerant	-	R407C						
Hydraulic circuit – Plate-to-plate evaporator								
Water flow - 30% glycol	m ³ /h	7.2	8.9	10.6	13.8	15.3	17.4	21.2
Pressure drop	kPa	90	105	120	100	115	70	120
Water/glycol volume	l	36	37	38	55	56	72	67
Water connections	Ø	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2
Hydraulic circuit – Shell and tube evaporator								
Water flow - 30%	m ³ /h	7.2	8.9	10.6	13.8	15.3	17.4	21.2
Pressure drop	kPa	65	90	100	80	95	55	100
Water/glycol volume	l	45	46	49	84	84	102	111
Water connections	Ø	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2	2"1/2
Condensing section / free-cooling								
Axial fans	n°	2	2	2	3	3	3	3
Nominal air flow	m ³ /h	20.500	19.500	19.500	30.000	30.000	27.600	45.000
Max abs. power	kW	2.2	2.2	2.2	3.3	3.3	3.3	6.6
Max abs. current	A	5	5	5	5	5	5	11.7
Unit el. data (4)								
Max operating abs. current	A	43.5	47.5	57.5	69.25	78.25	87.25	116
Max LRC	A	146.5	152.5	197.5	235.25	262.25	271.25	336
El. supply	V/f/Hz	400/3/50						
PAC - Version								
Tank volume	l	260	260	260	660	660	660	660
Pump abs. power	kW	0.55	0.55	1.5	1.5	1.85	1.85	1.85
Pump abs. current	A	1.6	1.6	3.5	3.5	5	5	5
ESP pump	kPa	75	100	130	140	125	160	95
Sound pressure level @ 1 m (5)								
STD Version	dB(A)	72	72	72	74	74	74	79
LN Version	dB(A)	70	70	70	72	72	72	77

Note:

- 1) Water temp. 16 °C / 10 °C; ambient air temp. 32 °C; glycol 30%;
- 2) Compressor + fans; except pumps.
- 3) Abs. Power in free-cooling operation; except pumps.
- 4) Except pumps.
- 5) Compressor side according to ISO 3744.

FREE-COOLING R 407C : PERFORMANCES

COOLING CAPACITY AND ABSORBED POWER

MOD.	EVAP. Tw °C out.	CONDENSER Ambient air temperature °C										FREE-COOLING amb. air °C			
		36		34		32		30		28		10	5	0	-5
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWf	kWf	kWf
51	6	39	17,1	40	16,4	42	15,6	43	15,0	44	14,3	-	23,9	40,4	57,5
	8	44	17,5	43	16,8	44	16,0	45	15,4	47	14,7	10,4	31,3	48,5	65,6
	10	42	17,9	52	17,2	47	16,4	48	15,7	50	15,0	20,9	38,7	56,6	73,6
	12	47	18,4	49	17,6	50	16,8	51	16,1	53	15,4	28,9	46,9	65,0	82,3
	14	50	18,9	51	18,1	53	17,3	55	16,5	56	15,8	36,7	55,1	73,6	91,0
	16	53	19,7	55	18,9	56	18,0	58	17,3	59	16,5	44,3	62,8	81,2	92,8
61	6	47	19,0	49	18,2	50	17,4	52	16,7	53	15,9	-	27,5	47,5	67,4
	8	51	19,5	52	18,6	54	17,8	55	17,1	57	16,3	10,8	33,6	52,4	71,3
	10	54	19,9	55	19,1	57	18,2	59	17,5	60	16,7	21,8	39,9	57,9	76,0
	12	57	20,4	59	19,6	60	18,7	62	17,9	64	17,1	27,4	44,5	61,6	79,2
	14	61	20,9	62	20,0	64	19,1	66	18,4	68	17,6	33,2	49,4	66,5	82,7
	16	64	21,9	66	20,9	68	20,0	70	19,2	72	18,3	38,2	54,2	70,7	86,6
81	6	57	25,2	58	24,1	60	23,0	62	22,0	63	21,1	-	25,1	44,3	62,4
	8	60	25,8	62	24,7	64	23,5	66	22,6	68	21,6	12,5	35,4	55,2	74,6
	10	64	26,4	66	25,2	68	24,1	70	23,1	72	22,1	25,1	45,6	66,0	86,7
	12	68	27,1	70	25,9	72	24,7	74	23,7	76	22,7	46,2	50,3	71,6	91,6
	14	72	27,7	74	26,5	77	25,4	79	24,3	81	23,2	38,6	57,9	77,2	96,5
	16	77	28,9	79	27,7	81	26,5	84	25,4	86	24,3	46,5	65,8	85,6	104,8
91	6	74	26,7	76	25,6	79	24,4	81	23,4	83	22,4	-	43,0	74,1	105,3
	8	79	27,4	81	26,2	84	25,0	86	24,0	89	22,9	16,9	52,5	81,9	111,3
	10	84	28,0	86	26,8	89	25,6	91	24,6	94	23,5	34,1	62,3	90,4	118,6
	12	89	28,7	92	27,5	94	26,3	97	25,2	100	24,1	42,7	69,4	96,1	123,7
	14	95	29,5	97	28,2	100	26,9	103	25,8	106	24,7	51,9	77,1	103,8	129,1
	16	100	30,8	103	29,4	106	28,1	109	27,0	113	25,8	59,6	84,6	110,4	135,3
111	6	82	32,8	85	31,4	87	30,0	90	28,7	92	27,5	-	44,6	75,8	107,2
	8	88	33,6	90	32,1	93	30,7	96	29,4	98	28,1	16,8	53,5	83,2	112,9
	10	93	34,4	96	32,9	99	31,4	102	30,1	105	28,8	34,7	62,7	92,4	120,5
	12	99	35,2	102	33,7	105	32,2	108	30,9	111	29,5	43,6	70,3	98,0	124,7
	14	105	36,1	108	34,6	112	33,0	115	31,7	118	30,3	52,8	79,2	105,5	130,4
	16	112	37,7	115	36,1	118	34,5	122	33,1	125	31,6	61,4	87,1	111,9	136,6
131	6	93	37,6	96	36,0	99	34,3	102	32,9	105	31,5	-	48,2	84,0	117,6
	8	99	38,5	102	36,8	105	35,2	108	33,7	111	32,3	17,9	58,2	91,8	124,3
	10	106	39,4	109	37,7	112	36,0	115	34,5	118	33,0	37,3	69,0	100,8	132,5
	12	112	40,4	116	38,7	119	36,9	123	35,4	126	33,9	47,0	76,2	106,4	137,8
	14	119	41,4	123	39,7	126	37,9	130	36,3	134	34,7	57,9	85,8	113,8	143,4
	16	126	43,2	130	41,4	134	39,5	138	37,9	142	36,2	66,1	94,1	121,0	150,1
151	6	114	47,6	117	45,5	121	43,5	124	41,7	128	39,9	-	61,7	104,9	148,4
	8	121	48,7	125	46,6	129	44,6	133	42,7	136	40,9	23,3	74,0	115,1	156,2
	10	129	49,9	133	47,7	137	45,6	141	43,7	145	41,8	48,0	86,7	127,8	166,7
	12	137	51,2	142	49,0	145	46,8	150	44,9	154	42,9	60,3	97,3	135,6	172,6
	14	146	52,5	150	50,2	155	48,0	159	46,0	163	44,0	73,0	109,6	146,0	180,4
	16	154	54,8	159	52,4	164	50,1	168	48,0	173	45,9	84,9	120,6	154,8	189,1

Tw - Out water temperature (30% ethylene glycol) deltaT=6°C

kWf - Cooling capacity

kWa - Abs. power (compressors only)

Shaded areas are referred to free-cooling operation only

Technical data FREE-COOLING

SIZE		181	212	242	262	292	322	352	
COOLING MODE									
Cooling capacity (1)	kW	181	198	227	254	274	309	360	
Abs. power (2)	kW	59,6	67,6	78,6	92	104,4	110,2	118	
Free-cooling									
Amb. Temp. (50% FC-capacity)	°C	8.2	7.5	7.2	8	7.5	7.6	8.2	
Amb. Temp. (100% FC-capacity)	°C	0.3	-1.1	-1.8	0.0	-1.1	-1.0	0.4	
Abs. power (3)	kW	8.8	6.6	6.6	13.2	13.2	13.2	17.6	
Compressors (scroll)									
Quantity	n°	2					4		
Refrigerant circuits	n°	1					2		
Capacity steps	n°	2					4		
Refrigerant	Type	R407C							
Hydraulic circuit – Plate-to-plate evaporator									
Water flow - 30% glycol	m ³ /h	26.2	28.6	32.8	36.7	39.6	44.8	52.1	
Pressure drop	kPa	125	125	85	125	135	135	135	
Water/glycol volume	l	100	115	145	130	130	175	200	
Water connections	Ø	2"1/2	3"	3"	3"	4"	4"	4"	
Hydraulic circuit – Shell and tube evaporator									
Water flow - 30% glycol	m ³ /h	26.2	28.6	32.8	36.7	39.6	44.8	52.1	
Pressure drop	kPa	95	105	55	105	115	105	105	
Water/glycol volume	l	200	205	230	220	220	300	315	
Water connections	Ø	2"1/2	3"	3"	3"	4"	4"	4"	
Condensing section / free-cooling									
Axial fans	n°	4	6	6	6	6	6	8	
Nom. Air flow	m ³ /h	64.500	60.000	55.200	90.000	90.000	84.000	129.000	
Max abs. power	kW	8.8	6.6	6.6	13.2	13.2	13.2	17.6	
Max abs. current	A	15.6	15	15	23.4	23.4	23.4	31.2	
Unit el. data (4)									
Max operating abs. current	A	141	156.5	174.5	210	232	253	282	
Max LRC	A	388.5	340.5	358.5	430	452	500.5	529.5	
El. supply	V/f/Hz	400/3/50							
PAC - Version									
Tank volume	l	1100	1100	1100	1100	1100	1100	1250	
Pump abs. power	kW	2.2	2.2	2.2	3.0	4.0	4.0	4.0	
Pump abs. current	A	4.5	4.5	4.5	6.0	7.4	7.4	7.4	
ESP pump	kPa	110	90	120	100	145	115	100	
Sound pressure level @ 1 m (5)									
STD Version	dB(A)	80	77	77	82	82	82	84	
LN Version	dB(A)	78	75	75	80	80	80	82	

Note:

- 1) Water temp. 16 °C / 10 °C; ambient air temp. 32 °C; glycol 30%;
- 2) Compressor + fans; except pumps.
- 3) Abs. Power in free-cooling operation, except pump
- 4) Except pump.
- 5) Compressor side according to ISO 3744.

FREE-COOLING R 407C : PERFORMANCES

COOLING CAPACITY AND ABSORBED POWER

MOD.	EVAP.	CONDENSER Ambient air temperature °C										FREE-COOLING amb. air °C			
	Tw °C out.	36		34		32		30		28		10	5	0	-5
		kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWa	kWf	kWf	kWf	kWf
181	6	151	53,0	155	50,7	160	48,5	164	46,5	169	44,4	-	87,4	150,8	214,1
	8	170	54,3	165	52,0	170	49,6	175	47,6	180	45,5	34,4	106,8	166,5	226,3
	10	160	55,6	199	53,2	181	50,8	186	48,7	191	46,6	69,3	126,7	183,9	241,3
	12	181	57,0	187	54,6	192	52,1	198	50,0	204	47,8	86,9	141,2	195,5	251,6
	14	192	58,5	198	56,0	203	53,4	210	51,3	216	49,0	105,5	156,7	211,0	262,5
	16	204	61,0	210	58,4	215	55,8	223	53,5	229	51,1	121,3	172,0	224,4	275,1
212	6	165	63,7	170	60,9	175	58,2	180	55,8	185	53,4	-	89,1	151,7	214,4
	8	176	65,2	181	62,4	186	59,6	192	57,2	197	54,7	33,7	106,9	166,3	225,7
	10	187	66,7	192	63,9	198	61,0	204	58,5	209	55,9	69,3	125,3	184,7	241,0
	12	198	68,5	205	65,5	210	62,6	217	60,0	223	57,4	87,1	140,6	196,0	249,5
	14	210	70,2	217	67,2	223	64,2	230	61,5	236	58,8	105,5	158,4	211,1	260,8
	16	223	73,3	230	70,1	237	67,0	243	64,2	250	61,4	122,8	174,2	223,7	273,2
242	6	189	75,1	195	71,9	200	68,7	206	65,9	212	63,0	-	97,6	170,3	238,4
	8	201	77,0	207	73,7	214	70,3	220	67,5	226	64,5	36,3	118,0	186,1	252,0
	10	214	78,8	220	75,4	227	72,0	233	69,0	240	66,0	75,6	139,8	204,3	268,5
	12	228	80,8	235	77,3	241	73,9	248	70,8	255	67,7	95,3	154,4	215,7	279,2
	14	241	82,9	249	79,3	256	75,7	263	72,6	271	69,5	117,4	173,9	230,6	290,6
	16	256	86,5	264	82,8	271	79,1	279	75,8	287	72,5	133,9	190,7	245,2	304,2
262	6	211	82,2	218	78,7	224	75,2	231	72,1	237	68,9	-	122,7	211,6	300,5
	8	225	84,2	232	80,6	239	77,0	246	73,8	253	70,6	48,3	149,9	233,7	317,5
	10	239	86,2	247	82,5	254	78,8	261	75,6	268	72,3	97,3	177,8	258,1	338,6
	12	255	88,4	262	84,6	269	80,8	278	77,5	286	74,1	121,9	198,1	274,3	353,1
	14	270	90,7	278	86,8	287	82,9	295	79,5	303	76,0	148,1	220,0	296,2	368,3
	16	286	94,7	295	90,6	304	86,5	312	83,0	321	79,3	170,2	241,3	315,0	386,1
292	6	228	95,2	235	91,1	242	87,0	249	83,4	256	79,8	-	123,3	209,9	296,7
	8	243	97,5	250	93,3	258	89,1	265	85,4	273	81,7	46,6	148,0	230,2	312,4
	10	258	99,8	266	95,5	274	91,2	282	87,5	290	83,6	95,9	173,4	255,6	333,5
	12	275	102,4	283	98,0	290	93,6	300	89,7	308	85,8	120,6	194,5	271,3	345,2
	14	291	105,0	300	100,5	309	95,9	318	92,0	327	88,0	146,0	219,2	292,1	360,9
	16	309	109,6	318	104,8	328	100,1	337	96,0	346	91,8	169,9	241,1	309,6	378,1
322	6	257	101,2	265	96,9	273	92,5	280	88,7	288	84,9	-	139,1	236,7	334,6
	8	274	103,7	282	99,2	291	94,8	299	90,9	307	86,9	52,5	166,9	259,6	352,3
	10	291	106,1	300	101,6	309	97,0	318	93,0	327	88,9	108,2	195,6	288,3	376,1
	12	310	108,9	319	104,2	328	99,5	338	95,4	348	91,3	136,0	219,4	305,9	389,3
	14	328	111,6	338	106,8	349	102,0	358	97,9	368	93,6	164,7	247,2	329,4	407,0
	16	348	116,5	359	111,5	370	106,5	380	102,1	391	97,7	191,6	271,9	349,2	426,4
352	6	299	104,8	309	100,3	318	95,8	327	91,9	336	87,8	-	173,9	299,9	425,9
	8	319	107,3	329	102,7	339	98,1	348	94,1	358	89,9	68,4	212,4	331,2	450,0
	10	339	109,8	350	105,1	360	100,4	370	96,3	381	92,1	137,9	252,0	365,8	479,9
	12	361	112,7	372	107,9	382	103,0	394	98,8	405	94,5	172,8	280,8	388,8	500,4
	14	383	115,5	394	110,6	406	105,6	417	101,3	429	96,9	209,9	311,8	419,8	522,0
	16	406	120,6	418	115,4	431	110,2	443	105,7	455	101,1	241,2	342,0	446,4	547,2

Tw -Out water temperature (30% ethylene glycol) deltaT=6°C

kWf - Cooling capacity

kWa - Abs. power (compressors only)

Shaded areas are referred to free-cooling operation only

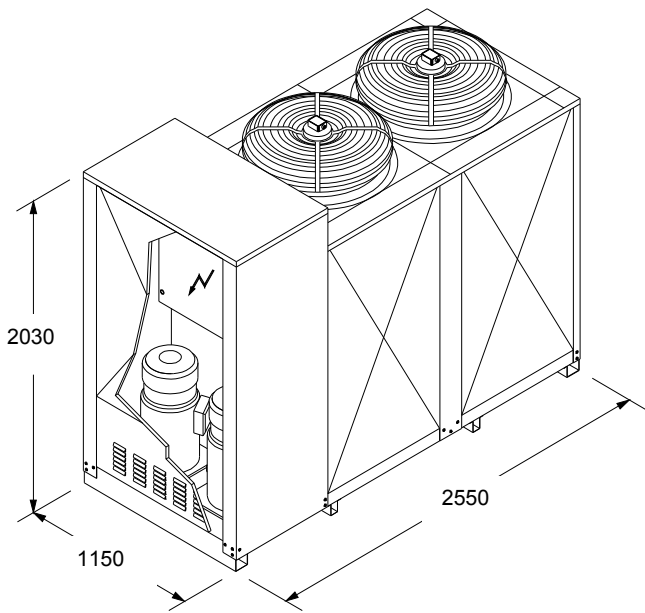


Fig. A
Mod. from **51 to 81 STD**

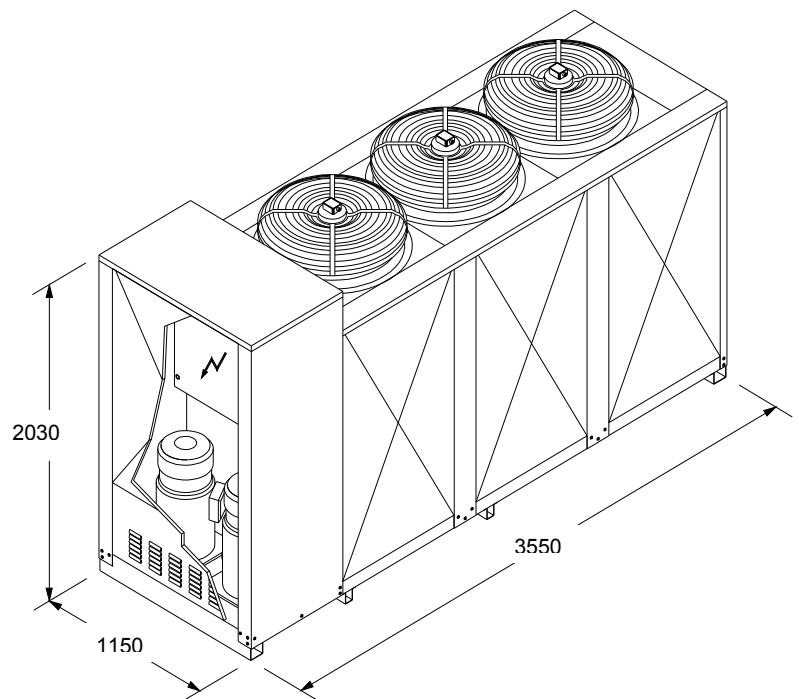


Fig. B
Mod. from **91 to 131 STD**

WEIGHTS (kg)

VERSIONS	STD						LN						
	Mod.	51	61	81	91	111	131	51	61	81	91	111	131
Fig.	A	A	A	B	B	B	A	A	A	B	B	B	B
Operation	860	910	940	1060	1270	1454	880	930	960	1080	1300	1484	
Transport	807	850	883	965	1186	1252	827	873	906	988	1215	1286	
“P”-Vers.													
Operation	890	950	970	1090	1310	1494	910	970	990	1110	1330	1514	
Transport	821	872	905	987	1211	1287	841	892	925	1007	1231	1307	
“PAC”-Vers.													
Operation	1192	1465	1498	1840	2064	2203	1215	1488	1521	1880	2094	2237	
Transport	892	965	998	1080	1304	1453	915	988	1021	1103	1333	1487	

Fig. C
Mod. from **151** to **181 STD**

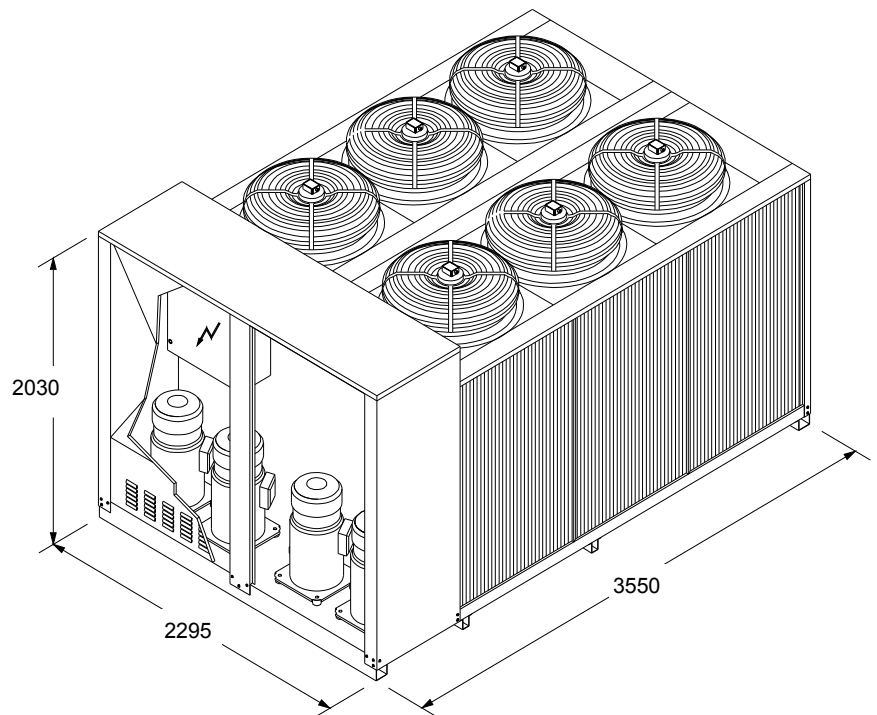
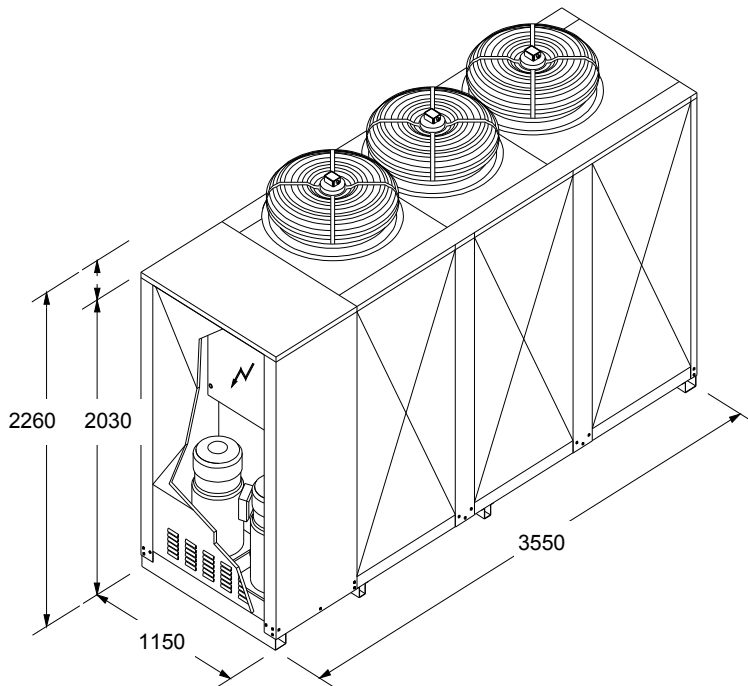


Fig. D
Mod. from **212** to **242 STD**

WEIGHTS (kg)

VERSIONS	STD				LN				
	Mod.	151	181	212	242	151	181	212	242
Fig.	C	C	D	D	C	C	D	D	
Operation	1452	2020	2230	2383	1472	2040	2250	2403	
Transport	1302	1870	2080	2233	1322	1890	2100	2253	
"P"-Vers.									
Operation	1502	1960	2215	2327	1522	1980	2235	2347	
Transport	1338	1910	2165	2277	1358	1930	2185	2297	
"PAC" -Vers.									
Operation	2254	3350	3531	3743	2288	3390	3590	3782	
Transport	1453	2150	2331	2543	1538	2190	2370	2612	

Fig. E
Mod. from 262 to 322 STD

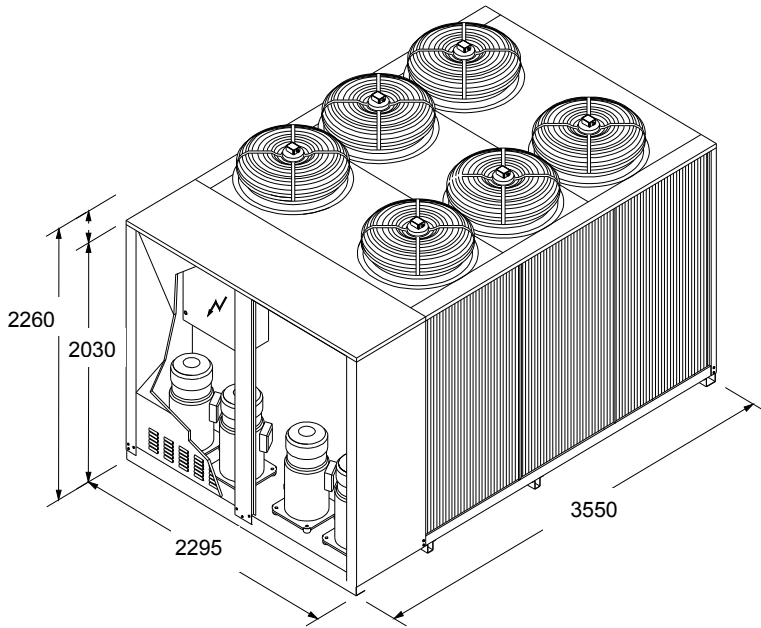
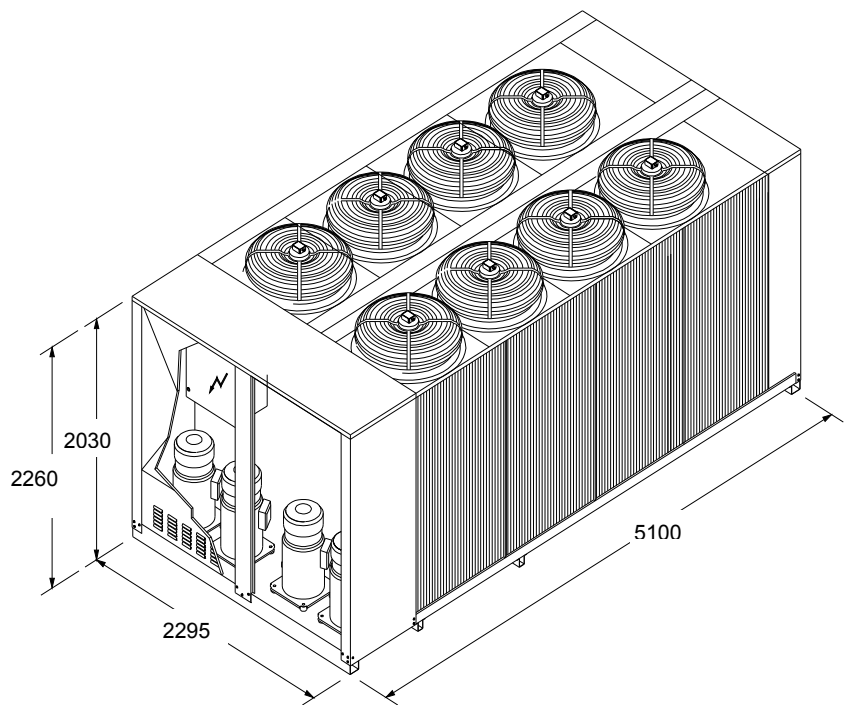


Fig. F
Mod. 352 STD



WEIGHTS (kg)

VERSIONS	STD				LN				
	Mod.	262	292	322	352	262	292	322	352
Fig.	E	E	E	F	E	E	E	F	
Operation	2630	2740	3150	3450	2670	2790	3190	3480	
Transport	2430	2540	2950	3250	2470	2590	2990	3280	
Vers. "P"									
Operation	2685	2797	3250	3550	2725	2840	3300	3600	
Transport	2485	2597	3050	3350	2525	2640	3100	3400	
Vers. "PAC"									
Operation	3860	3980	4450	4970	3900	4020	4490	5130	
Transport	2660	2780	3250	3650	2700	2820	3290	3690	

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