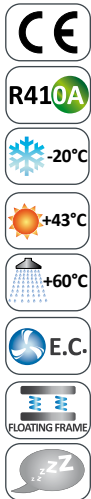
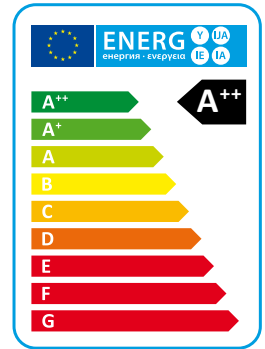


# LHA

## High efficiency air to water heat pumps



LHA

The LHA series of high efficiency heat pumps has been specifically designed for use with radiant floor heating systems or those applications where it is necessary to have maximum efficiency when heating.

They have been optimized on heating mode, are able to produce water up to 60°C and can operate down to -20°C ambient temperature.

All versions are supplied with reverse cycle valve used for winter defrost; the HH version is suitable for use in those countries that have support schemes for use of heat pump technology for heating. The RV versions are also able to produce cold water. The HH heating only versions is factory set and locked to operate only in heating mode whilst.

The noise is extremely low thanks to the use of a special floating vibration damping system which allows a noise reduction of about 10-12 dB(A) (Optional).

### Versions

- HH** Heating only.
- RV** Reversible heating/cooling.
- SA** Standard efficiency, AC fans.
- SE** Standard efficiency, EC fans.
- HA** High efficiency, AC fans.
- HE** High efficiency, EC fans.
- LS** Low noise.
- XL** Super low noise.
- P2U** 2 pipe systems without domestic hot water production.
- P2S** 2 pipe systems with domestic hot water production by external 3 way valve.

Heating only version (HH)

SA/LS/HH - P2S/P2U		252	302	402	452	502	602	702	802	902	1002	1202	1402
Heating capacity (EN14511) <sup>(1)</sup>	kW	22,0	28,7	34,5	47,2	50,9	56,8	64,9	73,2	80,2	97,0	105,7	122,3
Total input power (EN14511) <sup>(1)</sup>	kW	5,8	7,3	9,1	12,2	12,6	14,4	16,0	17,9	20,8	24,3	27,3	30,7
COP (EN14511) <sup>(1)</sup>	W/W	3,83	3,93	3,80	3,86	4,04	3,94	4,06	4,10	3,86	4,00	3,87	3,98
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,27	3,58	3,41	3,34	3,48	3,54	3,43	3,47	3,42	3,50	3,39	3,50
η <sub>s,h</sub> <sup>(2)</sup>	%	127,9	140,1	133,3	130,4	136,3	138,6	134,3	135,9	133,7	137,1	132,7	136,9
Sound power <sup>(3)</sup>	dB (A)	75	75	75	75	77	77	77	78	79	82	83	85
Sound pressure <sup>(4)</sup>	dB (A)	43	43	43	43	45	45	45	46	47	50	51	53
SE/LS/HH - P2S/P2U		252	302	402	452	502	602	702	802	902	1002	1202	1402
Heating capacity (EN14511) <sup>(1)</sup>	kW	21,9	28,6	34,2	47,1	51,1	57,1	64,9	73,1	81,0	97,0	105,6	122,7
Total input power (EN14511) <sup>(1)</sup>	kW	5,6	7,2	8,8	11,9	12,4	14,4	15,8	17,6	20,9	24,0	27,3	30,5
COP (EN14511) <sup>(1)</sup>	W/W	3,92	3,95	3,87	3,95	4,13	3,97	4,10	4,15	3,88	4,04	3,87	4,02
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,40	3,66	3,53	3,46	3,59	3,62	3,68	3,71	3,63	3,71	3,64	3,73
η <sub>s,h</sub> <sup>(2)</sup>	%	132,8	143,2	138,3	135,5	140,4	141,7	144,1	145,4	142,1	145,3	142,5	146,1
Sound power <sup>(3)</sup>	dB (A)	74	74	75	75	77	77	77	78	79	82	83	85
Sound pressure <sup>(4)</sup>	dB (A)	42	42	43	43	45	45	45	46	47	50	51	53
Power supply	V/Ph/Hz	400/3+N/50	400/3+N/50	400/3+N/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n° / n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
Fans	n°	2	2	2	2	2	2	2	2	2	3	3	3
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	Kg	5,5	5,7	6,9	8,3	8,4	9,3	11,9	14,6	14,9	17,4	17,4	22,1
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088
Equivalent CO <sub>2</sub> charge	t	11,5	11,8	14,5	17,2	17,5	19,5	24,8	30,5	31,1	36,3	36,3	46,1

SA/LS/HH - P2S/P2U		1602	1802	2002	2302	2502	2504	3004	3204	3504	4004	4504	5004
Heating capacity (EN14511) <sup>(1)</sup>	kW	136,0	157,3	169,0	196,6	215,0	211,8	226,1	258,8	330,6	357,4	393,3	431,7
Total input power (EN14511) <sup>(1)</sup>	kW	34,6	40,3	43,4	51,5	60,4	58,2	64,8	71,9	85,2	93,8	103,0	116,4
COP (EN14511) <sup>(1)</sup>	W/W	3,93	3,90	3,89	3,82	3,56	3,64	3,49	3,60	3,88	3,81	3,82	3,71
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,50	3,48	3,46	3,45	3,24	3,25	3,23	3,26	3,25	3,27	3,24	3,34
η <sub>s,h</sub> <sup>(2)</sup>	%	137,0	136,1	135,5	134,8	126,5	127,1	126,1	127,2	127,0	127,8	126,4	130,4
Sound power <sup>(3)</sup>	dB (A)	86	86	86	89	90	87	89	90	90	90	92	93
Sound pressure <sup>(4)</sup>	dB (A)	54	54	54	57	58	55	57	58	58	58	60	61
SE/LS/HH - P2S/P2U		1602	1802	2002	2302	2502	2504	3004	3204	3504	4004	4504	5004
Heating capacity (EN14511) <sup>(1)</sup>	kW	137,0	157,8	170,2	197,7	217,6	213,2	227,7	261,7	330,6	357,5	396,6	435,4
Total input power (EN14511) <sup>(1)</sup>	kW	34,6	38,8	43,3	51,5	60,3	57,9	65,1	71,9	82,9	92,1	102,7	116,7
COP (EN14511) <sup>(1)</sup>	W/W	3,96	4,07	3,93	3,84	3,61	3,68	3,50	3,64	3,99	3,88	3,86	3,73
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,68	3,77	3,72	3,74	3,63	3,54	3,49	3,46	3,52	3,57	3,63	3,58
η <sub>s,h</sub> <sup>(2)</sup>	%	144,0	147,8	145,8	146,4	142,1	138,6	136,5	135,2	137,9	139,6	142,3	140,0
Sound power <sup>(3)</sup>	dB (A)	86	86	86	89	90	87	89	90	90	90	92	93
Sound pressure <sup>(4)</sup>	dB (A)	54	54	54	57	58	55	57	58	58	58	60	61
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n° / n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2
Fans	n°	4	4	4	3	4	4	4	4	6	6	6	8
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	Kg	22,3	29,5	29,8	34,9	35,4	41	41,5	47,5	68,7	69,6	80,3	82,7
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088
Equivalent CO <sub>2</sub> charge	t	46,6	61,6	62,2	72,9	73,9	85,6	86,7	99,2	143,4	145,3	167,7	172,7

Performances are referred to the following conditions:

- (1) Heating: Ambient temperature 7°C DB, 6°C WB, water temperature 30/35°C.  
 (2) Average conditions, low temperature, variable - Reg EU 811/2013

(3) Sound power level in accordance with ISO 3744.

(4) Sound pressure level at 10 mt from the unit in free field conditions in accordance with ISO 3744.

Heating only version (HH)

HA/LS/HH - P2S/P2U		252	302	402	452	502	602	702	802	902	1002	1202	1402
Heating capacity (EN14511) <sup>(1)</sup>	kW	22,2	29,6	37,3	46,9	50,7	61,2	67,3	72,6	93,1	104,7	114,4	137,2
Total input power (EN14511) <sup>(1)</sup>	kW	5,3	7,1	9,0	11,4	12,0	13,6	15,4	17,0	22,1	25,3	28,4	32,4
COP (EN14511) <sup>(1)</sup>	W/W	4,11	4,12	4,13	4,11	4,22	4,49	4,38	4,27	4,21	4,14	4,03	4,24
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A++	A++	A++	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,40	3,69	3,53	3,57	3,67	3,97	3,91	3,87	3,70	3,67	3,69	3,70
η <sub>s,h</sub> <sup>(2)</sup>	%	132,9	144,7	138,0	139,6	143,8	155,7	153,4	151,6	145,1	143,7	144,4	144,8
Sound power <sup>(3)</sup>	dB (A)	75	75	75	75	76	76	77	78	82	83	85	86
Sound pressure <sup>(4)</sup>	dB (A)	43	43	43	43	44	44	45	46	50	51	53	54
HE/LS/HH - P2S/P2U		252	302	402	452	502	602	702	802	902	1002	1202	1402
Heating capacity (EN14511) <sup>(1)</sup>	kW	22,2	29,6	37,3	47,1	50,8	61,2	67,3	74,9	93,2	104,9	114,9	137,1
Total input power (EN14511) <sup>(1)</sup>	kW	5,3	7,1	8,8	11,5	11,8	13,3	15,1	17,2	21,2	24,5	27,8	30,9
COP (EN14511) <sup>(1)</sup>	W/W	4,11	4,16	4,23	4,11	4,32	4,61	4,46	4,36	4,40	4,29	4,13	4,44
Energy Class <sup>(2)</sup>		A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++
SCOP <sup>(2)</sup>	kWh/kWh	3,83	3,86	3,85	3,85	3,92	4,13	4,04	3,97	3,87	3,85	3,83	3,85
η <sub>s,h</sub> <sup>(2)</sup>	%	150,1	151,4	150,9	151,1	153,6	162,0	158,4	155,8	151,7	150,8	150,2	151,0
Sound power <sup>(3)</sup>	dB (A)	73	74	74	75	76	76	77	78	82	83	85	86
Sound pressure <sup>(4)</sup>	dB (A)	41	42	42	43	44	44	45	46	50	51	53	54
Power supply	V/Ph/Hz	400/3+N/50	400/3+N/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n° / n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
Fans	n°	2	2	2	2	2	2	2	2	2	2	2	3
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	Kg	7,7	7,7	10,6	10,9	11,1	14,8	14,9	15,2	22,5	22,5	22,5	34,4
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088
Equivalent CO <sub>2</sub> charge	t	16,1	16,1	22,1	22,7	23,2	30,9	31,1	31,7	47,0	47,0	47,0	71,8

HA/LS/HH - P2S/P2U		1602	1802	2002	2302	2502	2504	3004	3204	3504	4004	4504	5004
Heating capacity (EN14511) <sup>(1)</sup>	kW	150,8	167,2	182,0	209,7	239,2	228,6	270,2	295,6	335,0	363,1	404,5	458,7
Total input power (EN14511) <sup>(1)</sup>	kW	35,8	41,3	45,4	50,3	55,8	56,7	67,0	74,1	83,5	90,3	105,1	116,4
COP (EN14511) <sup>(1)</sup>	W/W	4,21	4,05	4,01	4,17	4,29	4,03	4,03	3,99	4,01	4,02	3,85	3,94
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A++	A+	A+	A+	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,74	3,69	3,62	3,76	3,83	3,65	3,63	3,65	3,66	3,73	3,61	3,63
η <sub>s,h</sub> <sup>(2)</sup>	%	146,4	144,7	141,9	147,3	150,3	143,1	142,0	142,9	143,3	146,1	141,4	142,0
Sound power <sup>(3)</sup>	dB (A)	87	87	87	89	91	88	89	90	90	90	92	92
Sound pressure <sup>(4)</sup>	dB (A)	55	55	55	57	59	56	57	58	58	58	60	60
HE/LS/HH - P2S/P2U		1602	1802	2002	2302	2502	2504	3004	3204	3504	4004	4504	5004
Heating capacity (EN14511) <sup>(1)</sup>	kW	151,0	167,9	182,8	210,6	241,3	229,4	271,4	296,7	339,0	364,9	407,0	463,7
Total input power (EN14511) <sup>(1)</sup>	kW	34,4	40,2	45,5	49,4	54,8	55,8	63,9	71,5	83,7	88,8	104,1	115,1
COP (EN14511) <sup>(1)</sup>	W/W	4,39	4,18	4,02	4,26	4,40	4,11	4,25	4,15	4,05	4,11	3,91	4,03
Energy Class <sup>(2)</sup>		A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++
SCOP <sup>(2)</sup>	kWh/kWh	3,86	3,85	3,84	3,92	3,97	3,83	3,85	3,83	3,91	3,89	3,87	3,86
η <sub>s,h</sub> <sup>(2)</sup>	%	151,3	150,9	150,4	153,6	155,6	150,2	151,1	150,3	153,5	152,4	151,9	151,5
Sound power <sup>(3)</sup>	dB (A)	87	87	87	89	91	88	89	90	90	90	92	92
Sound pressure <sup>(4)</sup>	dB (A)	55	55	55	57	59	56	57	58	58	58	60	60
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n° / n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2
Fans	n°	3	3	3	3	3	4	6	6	6	6	8	8
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	Kg	34,8	35,3	35,3	49,4	57,3	56,7	66,5	67,1	68,0	79,9	81,1	97,7
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088
Equivalent CO <sub>2</sub> charge	t	72,7	73,7	73,7	103,1	119,6	118,4	138,9	140,1	142,0	166,8	169,3	204,0

Performances are referred to the following conditions:

- (1) Heating: Ambient temperature 7°C DB, 6°C WB, water temperature 30/35°C.
- (2) Average conditions, low temperature, variable - Reg EU 811/2013

(3) Sound power level in accordance with ISO 3744.

(4) Sound pressure level at 10 mt from the unit in free field conditions in accordance with ISO 3744.

Reversible heating/cooling version (RV)

SA/LS/RV - P2S/P2U		252	302	402	452	502	602	702	802	902	1002	1202	1402
Heating capacity (EN14511) <sup>(1)</sup>	kW	22,0	28,7	34,5	47,2	50,9	56,8	64,9	73,2	80,2	97,0	105,7	122,3
Total input power (EN14511) <sup>(1)</sup>	kW	5,8	7,3	9,1	12,2	12,6	14,4	16,0	17,9	20,8	24,3	27,3	30,7
COP (EN14511) <sup>(1)</sup>	W/W	3,83	3,93	3,80	3,86	4,04	3,94	4,06	4,10	3,86	4,00	3,87	3,98
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,27	3,58	3,41	3,34	3,48	3,54	3,43	3,47	3,42	3,50	3,39	3,50
$\eta_{s,h}$ <sup>(2)</sup>	%	127,9	140,1	133,3	130,4	136,3	138,6	134,3	135,9	133,7	137,1	132,7	136,9
Cooling capacity (EN14511) <sup>(3)</sup>	kW	17,8	24,1	28,4	38,8	42,7	48,2	55,2	60,2	69,7	83,3	91,6	102,6
Total input power (EN14511) <sup>(3)</sup>	kW	7,1	9,8	11,7	15,0	16,4	19,8	21,9	24,5	29,3	32,7	37,7	42,6
EER (EN14511) <sup>(3)</sup>	W/W	2,52	2,45	2,42	2,58	2,61	2,43	2,52	2,46	2,38	2,55	2,43	2,41
Sound power <sup>(4)</sup>	dB (A)	75	75	75	75	77	77	77	78	79	82	83	85
Sound pressure <sup>(5)</sup>	dB (A)	43	43	43	43	45	45	45	46	47	50	51	53
<b>SE/LS/RV - P2S/P2U</b>		<b>252</b>	<b>302</b>	<b>402</b>	<b>452</b>	<b>502</b>	<b>602</b>	<b>702</b>	<b>802</b>	<b>902</b>	<b>1002</b>	<b>1202</b>	<b>1402</b>
Heating capacity (EN14511) <sup>(1)</sup>	kW	21,9	28,6	34,2	47,1	51,1	57,1	64,9	73,1	81,0	97,0	105,6	122,7
Total input power (EN14511) <sup>(1)</sup>	kW	5,6	7,2	8,8	11,9	12,4	14,4	15,8	17,6	20,9	24,0	27,3	30,5
COP (EN14511) <sup>(1)</sup>	W/W	3,92	3,95	3,87	3,95	4,13	3,97	4,10	4,15	3,88	4,04	3,87	4,02
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,40	3,66	3,53	3,46	3,59	3,62	3,68	3,71	3,63	3,71	3,64	3,73
$\eta_{s,h}$ <sup>(2)</sup>	%	132,8	143,2	138,3	135,5	140,4	141,7	144,1	145,4	142,1	145,3	142,5	146,1
Cooling capacity (EN14511) <sup>(3)</sup>	kW	17,7	24,1	28,2	39,0	43,5	48,9	55,6	61,3	70,3	84,3	92,0	103,5
Total input power (EN14511) <sup>(3)</sup>	kW	7,0	9,8	11,8	14,9	16,0	19,5	21,8	24,0	28,9	32,3	37,4	42,2
EER (EN14511) <sup>(3)</sup>	W/W	2,52	2,47	2,40	2,61	2,72	2,51	2,55	2,55	2,43	2,61	2,46	2,45
Sound power <sup>(4)</sup>	dB (A)	74	74	75	75	77	77	77	78	79	82	83	85
Sound pressure <sup>(5)</sup>	dB (A)	42	42	43	43	45	45	45	46	47	50	51	53
Power supply	V/Ph/Hz	400/3+N/50	400/3+N/50	400/3+N/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n° / n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
Fans	n°	2	2	2	2	2	2	2	2	2	3	3	3
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	Kg	5,5	5,7	6,9	8,3	8,4	9,3	11,9	14,6	14,9	17,4	17,4	22,1
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088
Equivalent CO <sub>2</sub> charge	t	11,5	11,8	14,5	17,2	17,5	19,5	24,8	30,5	31,1	36,3	36,3	46,1

SA/LS/RV - P2S/P2U		1602	1802	2002	2302	2502	2504	3004	3204	3504	4004	4504	5004
Heating capacity (EN14511) <sup>(1)</sup>	kW	136,0	157,3	169,0	196,6	215,0	211,8	226,1	258,8	330,6	357,4	393,3	431,7
Total input power (EN14511) <sup>(1)</sup>	kW	34,6	40,3	43,4	51,5	60,4	58,2	64,8	71,9	85,2	93,8	103,0	116,4
COP (EN14511) <sup>(1)</sup>	W/W	3,93	3,90	3,89	3,82	3,56	3,64	3,49	3,60	3,88	3,81	3,82	3,71
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,50	3,48	3,46	3,45	3,24	3,25	3,23	3,26	3,25	3,27	3,24	3,34
$\eta_{s,h}$ <sup>(2)</sup>	%	137,0	136,1	135,5	134,8	126,5	127,1	126,1	127,2	127,0	127,8	126,4	130,4
Cooling capacity (EN14511) <sup>(3)</sup>	kW	115,6	131,9	143,0	173,0	197,2	192,3	210,8	231,8	286,3	312,9	349,4	401,8
Total input power (EN14511) <sup>(3)</sup>	kW	47,2	53,8	63,6	68,9	76,7	76,0	87,5	97,8	106,0	121,8	138,1	153,4
EER (EN14511) <sup>(3)</sup>	W/W	2,45	2,45	2,25	2,51	2,57	2,53	2,41	2,37	2,70	2,57	2,53	2,62
Sound power <sup>(4)</sup>	dB (A)	86	86	86	89	90	87	89	90	90	90	92	93
Sound pressure <sup>(5)</sup>	dB (A)	54	54	54	57	58	55	57	58	58	58	60	61
<b>SE/LS/RV - P2S/P2U</b>		<b>1602</b>	<b>1802</b>	<b>2002</b>	<b>2302</b>	<b>2502</b>	<b>2504</b>	<b>3004</b>	<b>3204</b>	<b>3504</b>	<b>4004</b>	<b>4504</b>	<b>5004</b>
Heating capacity (EN14511) <sup>(1)</sup>	kW	137,0	157,8	170,2	197,7	217,6	213,2	227,7	261,7	330,6	357,5	396,6	435,4
Total input power (EN14511) <sup>(1)</sup>	kW	34,6	38,8	43,3	51,5	60,3	57,9	65,1	71,9	82,9	92,1	102,7	116,7
COP (EN14511) <sup>(1)</sup>	W/W	3,96	4,07	3,93	3,84	3,61	3,68	3,50	3,64	3,99	3,88	3,86	3,73
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,68	3,77	3,72	3,74	3,63	3,54	3,49	3,46	3,52	3,57	3,63	3,58
$\eta_{s,h}$ <sup>(2)</sup>	%	144,0	147,8	145,8	146,4	142,1	138,6	136,5	135,2	137,9	139,6	142,3	140,0
Cooling capacity (EN14511) <sup>(3)</sup>	kW	116,4	132,9	147,1	175,3	200,4	195,8	212,1	233,3	289,3	321,1	357,3	408,0
Total input power (EN14511) <sup>(3)</sup>	kW	46,9	53,4	61,0	67,9	75,6	74,4	86,9	96,8	104,8	118,1	135,9	150,0
EER (EN14511) <sup>(3)</sup>	W/W	2,48	2,49	2,41	2,58	2,65	2,63	2,44	2,41	2,76	2,72	2,63	2,72
Sound power <sup>(4)</sup>	dB (A)	86	86	86	89	90	87	89	90	90	90	92	93
Sound pressure <sup>(5)</sup>	dB (A)	54	54	54	57	58	55	57	58	58	58	60	61
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n° / n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2
Fans	n°	4	4	4	3	4	4	4	4	6	6	6	8
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	Kg	22,3	29,5	29,8	34,9	35,4	41	41,5	47,5	68,7	69,6	80,3	82,7
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088
Equivalent CO <sub>2</sub> charge	t	46,6	61,6	62,2	72,9	73,9	85,6	86,7	99,2	143,4	145,3	167,7	172,7

Performances are referred to the following conditions:

- (1) Heating: Ambient temperature 7°C DB, 6°C WB, water temperature 30/35°C.
- (2) Average conditions, low temperature, variable - Reg EU 811/2013

(3) Cooling: ambient air temperature 35°C, evaporator water temperature in/out 12/7 °C..

(4) Sound power level in accordance with ISO 3744..

(5) Sound pressure level at 10 mt from the unit in free field conditions in accordance with ISO 3744.

### Reversible heating/cooling version (RV)

HA/LS/RV - P2S/P2U		252	302	402	452	502	602	702	802	902	1002	1202	1402
Heating capacity (EN14511) <sup>(1)</sup>	kW	22,2	29,6	37,3	46,9	50,7	61,2	67,3	72,6	93,1	104,7	114,4	137,2
Total input power (EN14511) <sup>(1)</sup>	kW	5,3	7,1	9,0	11,4	12,0	13,6	15,4	17,0	22,1	25,3	28,4	32,4
COP (EN14511) <sup>(1)</sup>	W/W	4,11	4,12	4,13	4,11	4,22	4,49	4,38	4,27	4,21	4,14	4,03	4,24
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A++	A++	A++	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,40	3,69	3,53	3,57	3,67	3,97	3,91	3,87	3,70	3,67	3,69	3,70
η <sub>s,h</sub> <sup>(2)</sup>	%	132,9	144,7	138,0	139,6	143,8	155,7	153,4	151,6	145,1	143,7	144,4	144,8
Cooling capacity (EN14511) <sup>(3)</sup>	kW	18,1	24,5	30,8	39,9	44,2	52,3	57,4	62,6	79,8	89,6	97,8	117,0
Total input power (EN14511) <sup>(3)</sup>	kW	7,0	9,6	10,9	15,0	16,3	18,4	21,5	24,5	27,2	31,7	36,5	43,8
EER (EN14511) <sup>(3)</sup>	W/W	2,57	2,56	2,84	2,65	2,72	2,84	2,67	2,55	2,93	2,83	2,68	2,67
Sound power <sup>(4)</sup>	dB (A)	75	75	75	75	76	76	77	78	82	83	85	86
Sound pressure <sup>(5)</sup>	dB (A)	43	43	43	43	44	44	45	46	50	51	53	54
HE/LS/RV - P2S/P2U		252	302	402	452	502	602	702	802	902	1002	1202	1402
Heating capacity (EN14511) <sup>(1)</sup>	kW	22,2	29,6	37,3	47,1	50,8	61,2	67,3	74,9	93,2	104,9	114,9	137,1
Total input power (EN14511) <sup>(1)</sup>	kW	5,3	7,1	8,8	11,5	11,8	13,3	15,1	17,2	21,2	24,5	27,8	30,9
COP (EN14511) <sup>(1)</sup>	W/W	4,11	4,16	4,23	4,11	4,32	4,61	4,46	4,36	4,40	4,29	4,13	4,44
Energy Class <sup>(2)</sup>		A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++
SCOP <sup>(2)</sup>	kWh/kWh	3,83	3,86	3,85	3,85	3,92	4,13	4,04	3,97	3,87	3,85	3,83	3,85
η <sub>s,h</sub> <sup>(2)</sup>	%	150,1	151,4	150,9	151,1	153,6	162,0	158,4	155,8	151,7	150,8	150,2	151,0
Cooling capacity (EN14511) <sup>(3)</sup>	kW	18,1	24,6	30,5	40,6	44,2	52,4	57,5	63,4	80,5	90,2	100,5	117,4
Total input power (EN14511) <sup>(3)</sup>	kW	6,9	9,5	11,0	14,5	16,1	18,3	21,3	23,9	26,6	31,2	35,1	38,6
EER (EN14511) <sup>(3)</sup>	W/W	2,62	2,59	2,78	2,81	2,74	2,87	2,70	2,65	3,03	2,89	2,86	3,04
Sound power <sup>(4)</sup>	dB (A)	73	74	74	75	76	76	77	78	82	83	85	86
Sound pressure <sup>(5)</sup>	dB (A)	41	42	42	43	44	44	45	46	50	51	53	54
Power supply	V/Ph/Hz	400/3+N/50	400/3+N/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n° / n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
Fans	n°	2	2	2	2	2	2	2	2	2	2	2	3
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	Kg	7,7	7,7	10,6	10,9	11,1	14,8	14,9	15,2	22,5	22,5	22,5	34,4
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088
Equivalent CO <sub>2</sub> charge	t	16,1	16,1	22,1	22,7	23,2	30,9	31,1	31,7	47,0	47,0	47,0	71,8

HA/LS/RV - P2S/P2U		1602	1802	2002	2302	2502	2504	3004	3204	3504	4004	4504	5004
Heating capacity (EN14511) <sup>(1)</sup>	kW	150,8	167,2	182,0	209,7	239,2	228,6	270,2	295,6	335,0	363,1	404,5	458,7
Total input power (EN14511) <sup>(1)</sup>	kW	35,8	41,3	45,4	50,3	55,8	56,7	67,0	74,1	83,5	90,3	105,1	116,4
COP (EN14511) <sup>(1)</sup>	W/W	4,21	4,05	4,01	4,17	4,29	4,03	4,03	3,99	4,01	4,02	3,85	3,94
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A++	A+	A+	A+	A+	A+	A+	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,74	3,69	3,62	3,76	3,83	3,65	3,63	3,65	3,66	3,73	3,61	3,63
η <sub>s,h</sub> <sup>(2)</sup>	%	146,4	144,7	141,9	147,3	150,3	143,1	142,0	142,9	143,3	146,1	141,4	142,0
Cooling capacity (EN14511) <sup>(3)</sup>	kW	129,5	144,5	159,3	180,2	199,7	197,4	230,1	257,2	288,2	325,6	366,0	405,0
Total input power (EN14511) <sup>(3)</sup>	kW	44,3	51,8	58,8	66,3	74,5	73,1	81,9	91,5	105,6	116,7	136,1	155,2
EER (EN14511) <sup>(3)</sup>	W/W	2,92	2,79	2,71	2,72	2,68	2,70	2,81	2,81	2,73	2,79	2,69	2,61
Sound power <sup>(4)</sup>	dB (A)	87	87	87	89	91	88	89	90	90	90	92	92
Sound pressure <sup>(5)</sup>	dB (A)	55	55	55	57	59	56	57	58	58	58	60	60
HE/LS/RV - P2S/P2U		1602	1802	2002	2302	2502	2504	3004	3204	3504	4004	4504	5004
Heating capacity (EN14511) <sup>(1)</sup>	kW	151,0	167,9	182,8	210,6	241,3	229,4	271,4	296,7	339,0	364,9	407,0	463,7
Total input power (EN14511) <sup>(1)</sup>	kW	34,4	40,2	45,5	49,4	54,8	55,8	63,9	71,5	83,7	88,8	104,1	115,1
COP (EN14511) <sup>(1)</sup>	W/W	4,39	4,18	4,02	4,26	4,40	4,11	4,25	4,15	4,05	4,11	3,91	4,03
Energy Class <sup>(2)</sup>		A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++
SCOP <sup>(2)</sup>	kWh/kWh	3,86	3,85	3,84	3,92	3,97	3,83	3,85	3,83	3,91	3,89	3,87	3,86
η <sub>s,h</sub> <sup>(2)</sup>	%	151,3	150,9	150,4	153,6	155,6	150,2	151,1	150,3	153,5	152,4	151,9	151,5
Cooling capacity (EN14511) <sup>(3)</sup>	kW	129,5	146,8	159,2	180,4	202,1	198,5	231,0	259,7	289,4	322,6	368,5	416,0
Total input power (EN14511) <sup>(3)</sup>	kW	44,0	50,8	58,7	66,1	73,2	72,7	80,5	89,2	105,2	118,2	135,0	154,6
EER (EN14511) <sup>(3)</sup>	W/W	2,94	2,89	2,71	2,73	2,76	2,73	2,87	2,91	2,75	2,73	2,73	2,69
Sound power <sup>(4)</sup>	dB (A)	87	87	87	89	91	88	89	90	90	90	92	92
Sound pressure <sup>(5)</sup>	dB (A)	55	55	55	57	59	56	57	58	58	58	60	60
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n° / n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2
Fans	n°	3	3	3	3	3	4	6	6	6	6	8	8
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	Kg	34,8	35,3	35,3	49,4	57,3	56,7	66,5	67,1	68,0	79,9	81,1	97,7
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088
Equivalent CO <sub>2</sub> charge	t	72,7	73,7	73,7	103,1	119,6	118,4	138,9	140,1	142,0	166,8	169,3	204,0

Performances are referred to the following conditions:

(1) Heating: Ambient temperature 7°C DB, 6°C WB, water temperature 30/35°C.

(2) Average conditions, low temperature, variable - Reg EU 811/2013

(3) Cooling: ambient air temperature 35°C, evaporator water temperature in/out 12/7 °C..

(4) Sound power level in accordance with ISO 3744..

(5) Sound pressure level at 10 mt from the unit in free field conditions in accordance with ISO 3744.

Reversible heating/cooling version (RV)

HA/XL/RV - P2S/P2U		252	302	402	452	502	602	702	802	902	1002	1202	1402
Heating capacity (EN14511) <sup>(1)</sup>	kW	23,1	29,8	36,8	46,2	49,4	60,1	65,9	71,0	91,6	101,7	111,1	134,8
Total input power (EN14511) <sup>(1)</sup>	kW	5,6	7,2	8,8	11,2	11,7	13,4	15,1	16,7	20,9	23,9	27,0	30,5
COP (EN14511) <sup>(1)</sup>	W/W	4,12	4,13	4,20	4,12	4,21	4,50	4,35	4,25	4,39	4,26	4,11	4,42
Energy Class <sup>(2)</sup>		A+	A+	A+	A+	A+	A++	A++	A++	A++	A++	A+	A++
SCOP <sup>(2)</sup>	kWh/kWh	3,36	3,58	3,68	3,65	3,77	4,04	3,96	3,89	3,88	3,87	3,72	3,95
$\eta_{s,h}$ <sup>(2)</sup>	%	131,2	140,2	144,0	143,0	147,9	158,6	155,4	152,7	152,2	151,6	145,7	155,1
Cooling capacity (EN14511) <sup>(3)</sup>	kW	19,5	24,7	29,7	38,9	42,8	50,4	55,7	60,3	78,1	86,4	94,1	114,3
Total input power (EN14511) <sup>(3)</sup>	kW	7,2	9,7	11,2	15,4	16,7	19,1	22,0	25,1	26,7	31,5	36,8	39,0
EER (EN14511) <sup>(3)</sup>	W/W	2,72	2,55	2,65	2,54	2,57	2,64	2,53	2,40	2,93	2,74	2,56	2,93
Sound power <sup>(4)</sup>	dB (A)	70	70	70	70	72	72	72	73	75	76	78	80
Sound pressure <sup>(5)</sup>	dB (A)	38	38	38	38	40	40	40	41	43	44	46	48
<b>HE/XL/RV - P2S/P2U</b>		<b>252</b>	<b>302</b>	<b>402</b>	<b>452</b>	<b>502</b>	<b>602</b>	<b>702</b>	<b>802</b>	<b>902</b>	<b>1002</b>	<b>1202</b>	<b>1402</b>
Heating capacity (EN14511) <sup>(1)</sup>	kW	23,1	29,8	36,9	46,3	49,7	60,0	65,9	71,0	91,4	101,4	111,0	134,5
Total input power (EN14511) <sup>(1)</sup>	kW	5,5	7,1	8,5	11,1	11,4	13,1	14,9	16,6	20,3	23,4	26,4	29,6
COP (EN14511) <sup>(1)</sup>	W/W	4,23	4,18	4,34	4,16	4,35	4,59	4,42	4,29	4,51	4,34	4,21	4,55
Energy Class <sup>(2)</sup>		A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++
SCOP <sup>(2)</sup>	kWh/kWh	3,83	3,86	3,92	3,91	3,98	4,19	4,09	4,00	4,05	4,01	3,86	4,13
$\eta_{s,h}$ <sup>(2)</sup>	%	150,2	151,3	153,8	153,2	156,2	164,5	160,6	156,9	158,8	157,4	151,5	162,3
Cooling capacity (EN14511) <sup>(3)</sup>	kW	19,7	25,4	30,4	39,9	44,1	52,4	57,5	63,4	80,5	90,2	100,5	117,4
Total input power (EN14511) <sup>(3)</sup>	kW	7,0	9,3	10,9	14,9	16,2	18,3	21,3	24,0	26,6	31,2	35,2	38,6
EER (EN14511) <sup>(3)</sup>	W/W	2,83	2,73	2,78	2,67	2,72	2,87	2,70	2,65	3,03	2,89	2,86	3,04
Sound power <sup>(4)</sup>	dB (A)	64	65	67	69	72	72	72	73	74	76	78	79
Sound pressure <sup>(5)</sup>	dB (A)	32	33	35	37	40	40	40	41	42	44	46	47
Power supply	V/Ph/Hz	400/3+N/50	400/3+N/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n° / n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1
Fans	n°	2	2	2	2	2	2	2	2	2	2	2	3
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	Kg	7,7	7,7	10,6	10,9	11,1	14,8	14,9	15,2	22,5	22,5	22,5	34,4
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088
Equivalent CO <sub>2</sub> charge	t	16,1	16,1	22,1	22,7	23,2	30,9	31,1	31,7	47,0	47,0	47,0	71,8

HA/XL/RV - P2S/P2U		1602	1802	2002	2302	2502	2504	3004	3204	3504	4004	4504	5004
Heating capacity (EN14511) <sup>(1)</sup>	kW	148,2	162,5	176,9	204,1	232,2	221,2	265,0	287,3	317,0	349,0	389,3	439,8
Total input power (EN14511) <sup>(1)</sup>	kW	33,8	39,3	43,9	48,1	53,8	54,0	62,6	69,7	78,3	85,5	97,8	109,1
COP (EN14511) <sup>(1)</sup>	W/W	4,39	4,13	4,03	4,24	4,32	4,10	4,23	4,12	4,05	4,08	3,98	4,03
Energy Class <sup>(2)</sup>		A++	A++	A+	A++	A++	A+	A+	A+	A+	A++	A++	A+
SCOP <sup>(2)</sup>	kWh/kWh	3,92	3,86	3,76	4,00	3,98	3,74	3,79	3,78	3,82	3,88	3,83	3,81
$\eta_{s,h}$ <sup>(2)</sup>	%	153,7	151,3	147,3	156,8	156,3	146,5	148,6	148,2	149,8	152,0	150,3	149,2
Cooling capacity (EN14511) <sup>(3)</sup>	kW	124,4	139,3	152,2	174,1	187,4	190,3	223,6	245,3	275,7	306,0	353,1	381,9
Total input power (EN14511) <sup>(3)</sup>	kW	44,4	52,0	59,7	67,0	78,1	73,8	80,1	91,5	106,4	120,5	135,8	155,9
EER (EN14511) <sup>(3)</sup>	W/W	2,80	2,68	2,55	2,60	2,40	2,58	2,79	2,68	2,59	2,54	2,60	2,45
Sound power <sup>(4)</sup>	dB (A)	81	81	81	83	84	81	83	84	84	84	86	87
Sound pressure <sup>(5)</sup>	dB (A)	49	49	49	51	52	49	51	52	52	52	54	55
<b>HE/XL/RV - P2S/P2U</b>		<b>1602</b>	<b>1802</b>	<b>2002</b>	<b>2302</b>	<b>2502</b>	<b>2504</b>	<b>3004</b>	<b>3204</b>	<b>3504</b>	<b>4004</b>	<b>4504</b>	<b>5004</b>
Heating capacity (EN14511) <sup>(1)</sup>	kW	147,7	162,2	175,5	202,8	230,8	220,5	264,9	287,2	317,0	348,5	407,2	441,7
Total input power (EN14511) <sup>(1)</sup>	kW	33,0	38,6	43,4	47,6	52,9	53,0	60,9	68,2	77,1	84,6	97,2	108,0
COP (EN14511) <sup>(1)</sup>	W/W	4,48	4,20	4,04	4,26	4,36	4,16	4,35	4,21	4,11	4,12	4,19	4,09
Energy Class <sup>(2)</sup>		A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++	A++
SCOP <sup>(2)</sup>	kWh/kWh	4,06	4,01	3,85	4,10	4,06	3,84	3,97	3,92	3,96	3,97	3,97	3,91
$\eta_{s,h}$ <sup>(2)</sup>	%	159,5	157,4	151,1	161,0	159,3	150,4	155,9	153,8	155,5	155,9	155,8	153,5
Cooling capacity (EN14511) <sup>(3)</sup>	kW	129,5	146,8	159,2	180,4	202,1	198,5	231,0	259,7	289,4	322,6	368,5	406,9
Total input power (EN14511) <sup>(3)</sup>	kW	44,1	50,8	58,8	66,2	73,3	72,7	80,5	89,2	105,2	118,2	135,0	151,3
EER (EN14511) <sup>(3)</sup>	W/W	2,94	2,89	2,71	2,73	2,76	2,73	2,87	2,91	2,75	2,73	2,73	2,69
Sound power <sup>(4)</sup>	dB (A)	80	81	81	83	84	81	82	83	84	84	86	87
Sound pressure <sup>(5)</sup>	dB (A)	48	49	49	51	52	49	50	51	52	52	54	55
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Compressors / Circuits	n° / n°	2 / 1	2 / 1	2 / 1	2 / 1	2 / 1	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2
Fans	n°	3	3	3	3	3	4	6	6	6	6	8	8
Refrigerant		R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A	R410A
Refrigerant charge	Kg	34,8	35,3	35,3	49,4	57,3	56,7	66,5	67,1	68,0	79,9	81,1	97,7
Global warming potential (GWP)		2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088	2088
Equivalent CO <sub>2</sub> charge	t	72,7	73,7	73,7	103,1	119,6	118,4	138,9	140,1	142,0	166,8	169,3	204,0

Performances are referred to the following conditions:

- (1) Heating: Ambient temperature 7°C DB, 6°C WB, water temperature 30/35°C.
- (2) Average conditions, low temperature, variable - Reg EU 811/2013

(3) Cooling: ambient air temperature 35°C, evaporator water temperature in/out 12/7 °C..

(4) Sound power level in accordance with ISO 3744..

(5) Sound pressure level at 10 mt from the unit in free field conditions in accordance with ISO 3744.

## Frame

All units are made from hot-galvanised sheet steel, painted with polyurethane powder enamel and stoved at 180°C to provide maximum protection against corrosion. The frame is self-supporting with removable panels. All screws and rivets used are made from stainless steel. The standard colour of the units is RAL9018.

## Refrigerant circuit

The refrigerant utilised is R410A. The refrigerant circuit is assembled using internationally recognised brand name components with all brazing and welding being performed in accordance with ISO 97/23. The refrigerant circuit includes: sight glass, filter drier, two thermal expansion valves (one for cooling mode, one for heating mode) with external equalizer, 4 way reversing valve, check valves, liquid receiver, Schrader valves for maintenance and control, pressure safety device (for compliance with PED regulations).

## Compressors

The compressors used are a high performance scroll type that incorporates a special scroll design which enhances the efficiency of the refrigerant cycle when the source temperature is low. In all units the compressors are connected in tandem.

The compressors are all supplied with a crankcase heater and thermal overload protection by a klixon embedded in the motor winding. They are mounted in a separate enclosure in order to be separated from the air stream thus enabling them to be maintained even if the unit is operating. Access to this enclosure is by the front panel of the unit. The crankcase heater is always powered when the compressor is in stand-by.

## Source heat exchanger

The source heat exchanger is made from 3/8" copper pipes and 0,1mm thick aluminium fins with the tubes being mechanically expanded into the aluminium fins in order to maximise heat transfer. Furthermore, the design guarantees a low air side pressure drop thus enabling the use of low rotation speed (and hence low noise) fans. All heat exchangers are supplied standard with fins hydrophilic coating.

## User heat exchangers

The user heat exchanger is a braze welded, plate type heat exchanger, manufactured from AISI 316 stainless steel. The use of this type of exchanger results in a massive reduction of the refrigerant charge of the unit compared to a traditional shell-in-tube type. A further advantage is a reduction in the overall dimensions of the unit.

The exchangers are factory insulated with flexible close cell material and can be fitted with an antifreeze heater (accessory). Each exchanger is fitted with a temperature sensor on the discharge water side for antifreeze protection.

## Fans

The fans are direct drive axial type with aluminium aerofoil blades,

are statically and dynamically balanced and are supplied complete with a safety fan guard complying with the requirements of EN 60335.

They are fixed to the unit frame via rubber anti-vibration mountings. The electric motors, in LS versions are 6 poles type rotating at approximately 900 rpm. In the XL versions the fans are 8 poles type (approx 600 rpm). The motors are fitted with integrated thermal overload protection and have a moisture protection rating of IP 54.

## Microprocessors

All units are supplied as standard with microprocessor controls. The microprocessor controls the following functions: control of the water temperature, antifreeze protection, compressor timing, compressor automatic starting sequence (For multiple compressors), alarm reset.

The control panel is supplied with display showing all operational icons. The microprocessor is set for automatic defrost (when operating in severe ambient conditions) and for summer/ winter change over (only for RV versions).

The control also manages the anti-legionella program, the integration with other heating sources (electric heaters, boilers, solar panels etc), the operation of a three port modulating valve (for diverting to DHW or heating) and both the heating circuit pump and the domestic hot water circuit pump. If required (available as an option), the microprocessor can be configured in order for it to connect to a site BMS system thus enabling remote control and management.

The technical department can discuss and evaluate, in conjunction with the customer, solutions using MODBUS protocols.

## Electric enclosure

The enclosure is manufactured in order to comply with the requirements of the electromagnetic compatibility standards CEE EN60204. Access to the enclosure is achieved by removing the front panel of the unit. The following components are supplied as standard on all units: main switch, a sequence relay that disables the power supply in the event that the phase sequence is incorrect (scroll compressors can be damaged if they rotate in the wrong direction), thermal overloads (protection of pumps and fans), compressor fuses, control circuit automatic breakers, compressor contactors, fan contactors and pump contactors. The terminal board has volt free contacts for remote ON-OFF, Summer/ winter change over (heat pumps only) and general alarm.

## Control and protection devices

All units are supplied with the following controls and protections: user water return temperature sensor, antifreeze protection temperature sensor installed on users water output, domestic hot water supply and return temperature sensors (only versions P2S), high pressure manual reset, low pressure automatic reset, compressor thermal protection, air fan, thermal protection, pressure transducer (used to optimize the defrost cycle and to adjust the

fan speed depending on ambient conditions), flow switch. All units in HA and HE versions are also fitted with a temperature probe sensor with "Energy Saving" function, supplied in a separate plastic box, which can be used to stop the pump use during periods of stand-by, when the water temperature reaches the set point. Doing this the power consumption of the unit is strongly reduced.

The probe sensor must be positioned in the hydraulic compensator present at the screening technique. The domestic hot water circuit (only versions P2S) is already equipped with this probe, but it must be installed in the user circuit.

## Versions

### Version HH

HH heating only versions are available in the P2U and P2S configuration only.

### Version RV

This version uses 2 hydraulic connections and is able to produce hot water in winter and cold water in summer. The unit is combined with a 2-pipe system.

### SA Version

Standard efficiency version, according to ERP2018 standard. Unit equipped with AC fans.

### SE Version

Standard efficiency version, according to ERP2018 standard. Unit equipped with EC fans.

### HA Version

High efficiency version, according to ERP2018 standard. Unit equipped with AC fans.

### HE Version

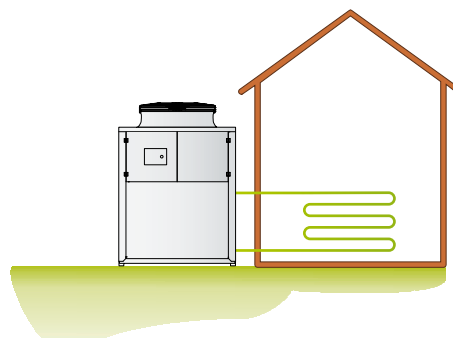
High efficiency version, according to ERP2018 standard. Unit equipped with EC fans.

### Version LS

This version includes the complete acoustic insulation of the unit with compressor jackets and insulating material made with high density media and the interposition of heavy bitumen layer.

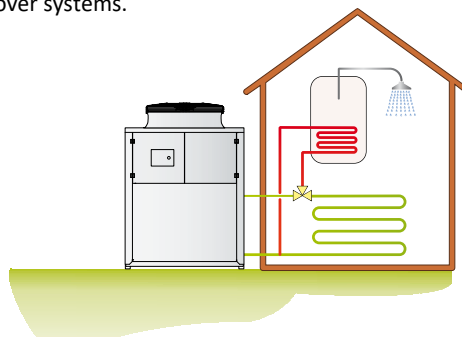
### P2U Version

This is a two pipe version that can produce hot water for heating (HH heating only) and hot or cold water in the RV version. The RV is used with two pipe water based change-over systems. It is not able to produce domestic hot water.



### P2S Version

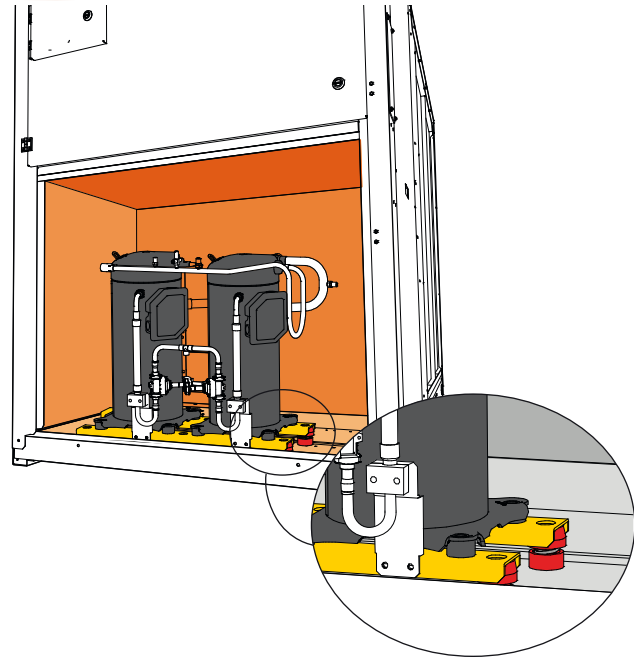
This is a two pipe version that can, in addition to producing hot water for heating (HH version) and hot and cold water in the RV version can also generate domestic hot water. The controller has dual heating set points (heating and DHW) and can also control a three port diverting valve that directs the DHW to the cylinder. DHW production has priority irrespective of the mode of operation of the unit. The unit is normally used with two pipe water based change-over systems.





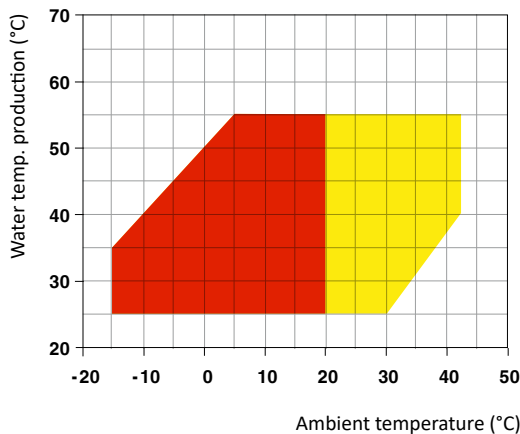
**HA/XL HE/XL Super low noise version**

All HA and HE units in XL super low noise version are supplied, as standard, with the latest 'Floating Frame' technology that completely isolates the compressors from the main casing, thereby eliminating vibration and noise from this source. The 'Floating Frame' is a special vibration and acoustic damping system that consists of a base plate and acoustic enclosure that houses the compressors. The base plate is separated from the supporting frame of the unit by soft steel springs that have a high damping power. Within the enclosure, the compressors are mounted on rubber shock absorbers on the floating base plate. The enclosure is manufactured from galvanized steel sandwich panels that have a micro-perforated inner skin and a core of 50 mm thick, high density (40 kg/m<sup>3</sup>) mineral wool. The entire arrangement provides a double damping system and acoustic attenuation. The compressor refrigerant pipes are connected to the refrigerant circuit through "anaconda" flexible connections. Flexible connections are also used on the water pipework within the unit. The combination of these systems results in an overall noise reduction in the region of 10-12 dB(A).

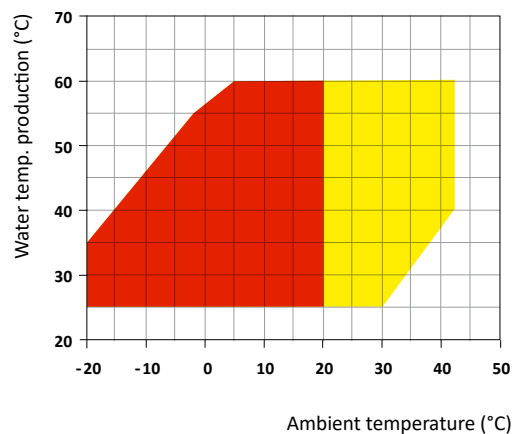


**Operation limits**

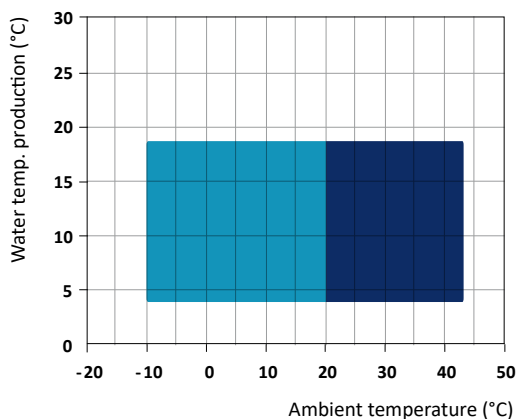
(SA/SE versions)



(HA/HE versions)



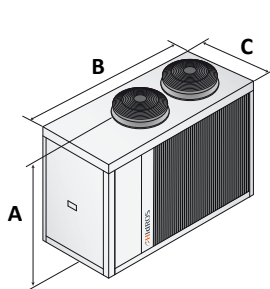
(RV versions Only)



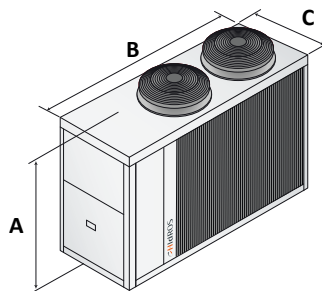
- Heating mode
- Heating mode with head pressure control (DCCF)
- Cooling with head pressure control (DCCF)
- Cooling mode

LHA SA-SE/HH-RV	LHA HA-HE /HH-RV	P2S/P2U	252	302	402	452	502	602	702	802
Flow switch			●	●	●	●	●	●	●	●
User circuit water strainer			○	○	○	○	○	○	○	○
“Floating frame” Technology - LS Version			-	-	-	-	-	-	-	-
“Floating frame” Technology - XL Version			●	●	●	●	●	●	●	●
E.C. fans - SA versions	VECE		-	-	-	-	-	-	-	-
E.C. fans - SE versions	VECE		●	●	●	●	●	●	●	●
E.C. fans - HA versions	VECE		-	-	-	-	-	-	-	-
E.C. fans - HE versions	VECE		●	●	●	●	●	●	●	●
Condensate discharge drip tray with antifreeze heater	BRCA		○	○	○	○	○	○	○	○
Evap/cond. press. control by transducer and fan speed control	DCCF		○	○	○	○	○	○	○	○
Antifreeze kit for 2 pipe units	RAEV2		○	○	○	○	○	○	○	○
Electronic soft starter	DSSE		○	○	○	○	○	○	○	○
Serial interface card RS485	INSE		○	○	○	○	○	○	○	○
Rubber anti-vibration mountings	KAVG		○	○	○	○	○	○	○	○
Remote control panel	PCRL		○	○	○	○	○	○	○	○
Electronic expansion valve	VTEE		○	○	○	○	○	○	○	○
Cascade control system via RS485	SGRS		○	○	○	○	○	○	○	○
Hydraulic kit with one pump with tank	A1ZZU		○	○	○	○	○	○	○	○
Hydraulic kit with two pumps with tank	A2ZZU		○	○	○	○	○	○	○	○
Hydraulic kit with one pump without tank	A1NTU		○	○	○	○	○	○	○	○
Hydraulic kit with two pumps without tank	A2NTU		○	○	○	○	○	○	○	○

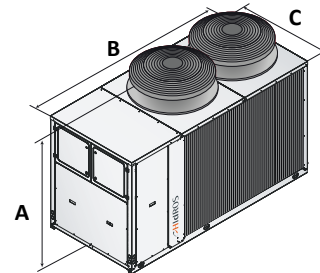
● Standard ○ Optional – Not available



SA/SE 252 - 302 - 402  
HA/HE 252 - 302



SA/SE 452 - 502 - 602  
HA/HE 402 - 452 - 502

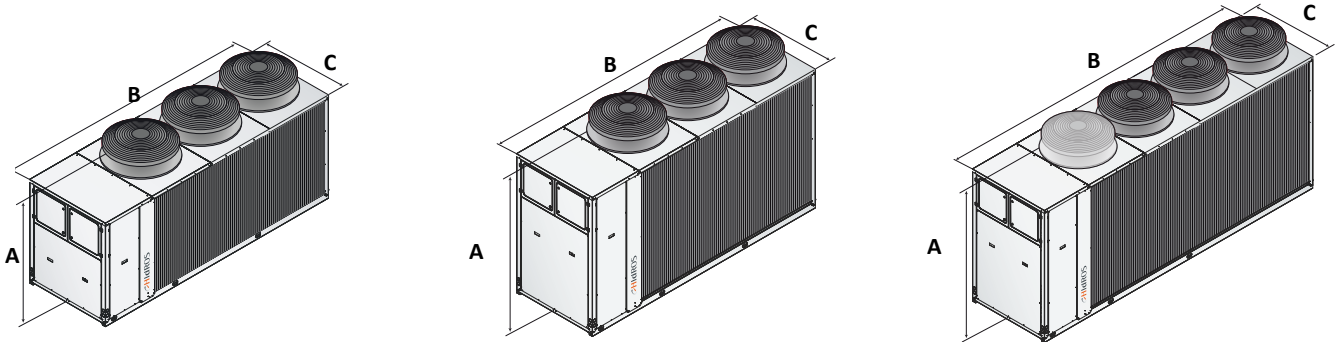


SA/SE 702 - 802 - 902  
HA/HE 602 - 702 - 802 - 902 - 1002 - 1202

		252	302	402	452	502	602	702	802
A	SA-SE/LS	1490	1490	1490	1680	1680	1680	1840	1840
B	SA-SE/LS	1915	1915	1915	2115	2115	2115	2905	2905
C	SA-SE/LS	875	875	875	875	875	875	1145	1145
Kg	SA-SE/LS	550	550	560	670	700	760	880	890
A	HA-HE/LS	1490	1490	1680	1680	1680	1840	1840	1840
B	HA-HE/LS	1915	1915	2115	2115	2115	2905	2905	2905
C	HA-HE/LS	875	875	875	875	875	1145	1145	1145
Kg	HA-HE/LS	560	560	670	690	720	1060	1060	1070
A	HA-HE/XL	1470	1470	1680	1680	1680	1840	1840	1840
B	HA-HE/XL	1910	1910	2115	2115	2115	2905	2905	2905
C	HA-HE/XL	900	900	875	875	875	1145	1145	1145
Kg	HA-HE/XL	570	570	680	710	740	1080	1080	1090

LHA SA-SE/HH-RV LHA HA-HE /HH-RV	P2S/P2U	902	1002	1202	1402	1602	1802	2002	2302
Flow switch		●	●	●	●	●	●	●	●
User circuit water strainer		○	○	○	○	○	○	○	○
“Floating frame” Technology - LS Version		–	–	–	–	–	–	–	–
“Floating frame” Technology - XL Version		●	●	●	●	●	●	●	●
E.C. fans - SA versions	VECE	–	–	–	–	–	–	–	–
E.C. fans - SE versions	VECE	●	●	●	●	●	●	●	●
E.C. fans - HA versions	VECE	–	–	–	–	–	–	–	–
E.C. fans - HE versions	VECE	●	●	●	●	●	●	●	●
Condensate discharge drip tray with antifreeze heater	BRCA	○	○	○	○	○	○	○	○
Evap/cond. press. control by transducer and fan speed control	DCCF	○	○	○	○	○	○	○	○
Antifreeze kit for 2 pipe units	RAEV2	○	○	○	○	○	○	○	○
Electronic soft starter	DSSE	○	○	○	○	○	○	○	○
Serial interface card RS485	INSE	○	○	○	○	○	○	○	○
Rubber anti-vibration mountings	KAVG	○	○	○	○	○	○	○	○
Remote control panel	PCRL	○	○	○	○	○	○	○	○
Electronic expansion valve	VTEE	○	○	○	○	○	○	○	○
Cascade control system via RS485	SGRS	○	○	○	○	○	○	○	○
Hydraulic kit with one pump with tank	A1ZZU	○	○	○	○	○	○	○	○
Hydraulic kit with two pumps with tank	A2ZZU	○	○	○	○	○	○	○	○
Hydraulic kit with one pump without tank	A1NTU	○	○	○	○	○	○	○	○
Hydraulic kit with two pumps without tank	A2NTU	○	○	○	○	○	○	○	○

● Standard ○ Optional – Not available



SA/SE 1002 - 1202 - 1402 - 1602  
HA/HE 1402 - 1602 - 1802 - 2002

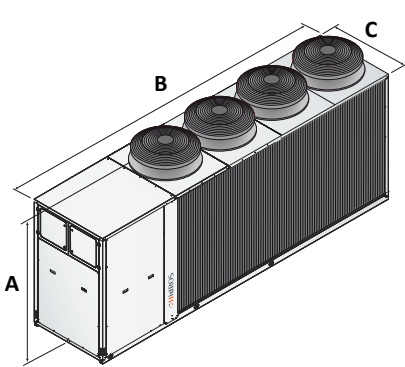
SA/SE 1802 - 2002  
HA/HE 2302 - 2502

SA/SE 2302 - 2502

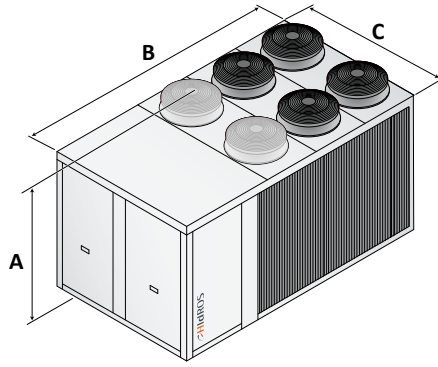
		902	1002	1202	1402	1602	1802	2002	2302
A	SA-SE/LS	1840	1890	1890	1890	1890	2280	2280	2310
B	SA-SE/LS	2905	3905	3905	3905	3905	3905	3905	4505
C	SA-SE/LS	1145	1145	1145	1145	1145	1145	1145	1145
Kg	SA-SE/LS	910	1190	1270	1320	1360	1690	1710	1990
A	HA-HE/LS	1840	1840	1840	1820	1820	1820	1820	2280
B	HA-HE/LS	2905	2905	2905	3965	3965	3965	3965	3905
C	HA-HE/LS	1145	1145	1145	1150	1150	1150	1150	1145
Kg	HA-HE/LS	1120	1160	1240	1560	1580	1600	1620	1790
A	HA-HE/XL	1820	1820	1820	1890	1890	1890	1890	2280
B	HA-HE/XL	2905	2905	2905	3905	3905	3905	3905	3905
C	HA-HE/XL	1150	1150	1150	1145	1145	1145	1145	1145
Kg	HA-HE/XL	1140	1180	1260	1590	1610	1630	1650	1820

LHA SA-SE/HH-RV LHA HA-HE /HH-RV	P2S/P2U	2502	2504	3004	3204	3504	4004	4504	5004
Flow switch		●	●	●	●	●	●	●	●
User circuit water strainer		○	○	○	○	○	○	○	○
“Floating frame” Technology - LS Version		–	–	–	–	–	–	–	–
“Floating frame” Technology - XL Version		●	●	●	●	●	●	●	●
E.C. fans - SA versions	VECE	–	–	–	–	–	–	–	–
E.C. fans - SE versions	VECE	●	●	●	●	●	●	●	●
E.C. fans - HA versions	VECE	–	–	–	–	–	–	–	–
E.C. fans - HE versions	VECE	●	●	●	●	●	●	●	●
Condensate discharge drip tray with antifreeze heater	BRCA	○	○	○	○	○	○	○	○
Evap/cond. press. control by transducer and fan speed control	DCCF	○	○	○	○	○	○	○	○
Antifreeze kit for 2 pipe units	RAEV2	○	○	○	○	○	○	○	○
Electronic soft starter	DSSE	○	○	○	○	○	○	○	○
Serial interface card RS485	INSE	○	○	○	○	○	○	○	○
Rubber anti-vibration mountings	KAVG	○	○	○	○	○	○	○	○
Remote control panel	PCRL	○	○	○	○	○	○	○	○
Electronic expansion valve	VTEE	○	○	○	○	○	○	○	○
Cascade control system via RS485	SGRS	○	○	○	○	○	○	○	○
Hydraulic kit with one pump with tank	A1ZZU	○	○	○	○	○	○	○	○
Hydraulic kit with two pumps with tank	A2ZZU	○	○	○	○	○	○	○	○
Hydraulic kit with one pump without tank	A1NTU	○	○	○	○	○	○	○	○
Hydraulic kit with two pumps without tank	A2NTU	○	○	○	○	○	○	○	○

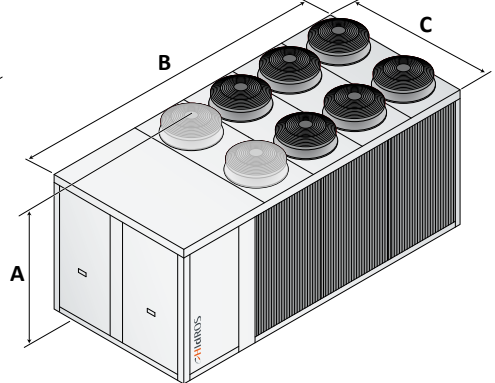
● Standard ○ Optional – Not available



SA/SE 2504 - 3004 - 3204



SA/SE 3504 - 4004  
HA/HE 2504 - 3004 - 3204 - 3504



SA/SE 4504 - 5004  
HA/HE 4004 - 4504 - 5004

		2502	2504	3004	3204	3504	4004	4504	5004
A	SA-SE/LS	2310	2305	2305	2305	2355	2355	2350	2350
B	SA-SE/LS	4505	5295	5295	5295	4205	4205	4805	4805
C	SA-SE/LS	1145	1145	1145	1145	2210	2210	2210	2210
Kg	SA-SE/LS	2040	2500	2540	2620	3220	3270	3600	3700
A	HA-HE/LS	2280	2355	2355	2355	2355	2350	2350	2350
B	HA-HE/LS	3905	4205	4205	4205	4205	4805	4805	4805
C	HA-HE/LS	1145	2210	2210	2210	2210	2210	2210	2210
Kg	HA-HE/LS	1820	3170	3220	3270	3320	3660	3720	3780
A	HA-HE/XL	2280	2355	2355	2355	2355	2350	2350	2350
B	HA-HE/XL	3905	4205	4205	4205	4205	4805	4805	4805
C	HA-HE/XL	1145	2210	2210	2210	2210	2210	2210	2210
Kg	HA-HE/XL	1850	3220	3270	3320	3370	3710	3770	3830