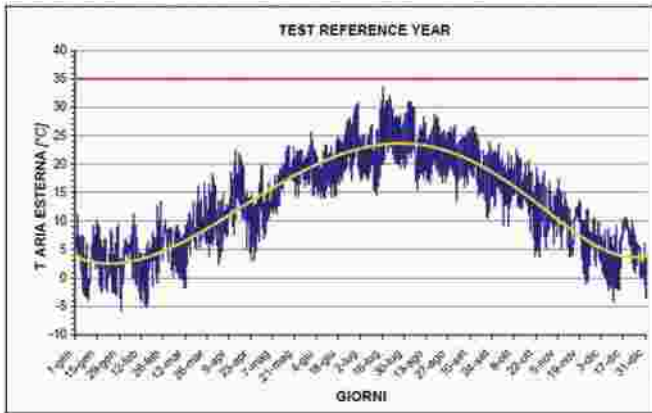


LSE MULTI-SCROLL SOLUTIONS FOR HIGH PERFORMANCE UNDER PARTIAL LOAD CONDITIONS

Though a water chiller or heat pump is chosen on the basis of the maximum load of the system it is intended to serve, the actual thermal load of an air conditioning system is less than 60% of the rated load capacity 90% of the time.



The **LSE** range of chillers and heat pumps includes 14 models with capacities from 370 to 1200 kW (650 kW in heat pump mode) and uses only scroll compressors on 2 or 4 cooling circuits.

HIGH EFFICIENCY UNDER PARTIAL LOAD CONDITIONS

The number of compressors, according to size, is 2 or 3 per cooling circuit, multiplying the capacity control steps.

The high number of capacity control steps enables the unit to adapt its power to the actual needs of the system, with particular gains in efficiency under partial load conditions compared to traditional screw compressors. The control microprocessor automatically distributes the workload among the compressors, thus increasing their lifespan.

During operation under partial load conditions, the compressors work with oversized exchange surfaces so as to achieve more advantageous thermodynamic cycles, thanks also to the use of an **electronic expansion valve, a standard feature of all models.**

VERSIONS

- Cooling Only
- Free-Cooling
- Heat pump, up to 650 kW

WATER PUMP OPTIONS

Complete hydronic kits can be incorporated within the units without modifying their size and you have the option of choosing the water circulation pump.

- Single pump, standard head or uprated (high head).
- Dual pumps, OR solution: standard head or uprated, operating singly. The pumps operate in turns on a time/fault basis.
- Dual pump, "AND" solution: standard or uprated pump, operating simultaneously.

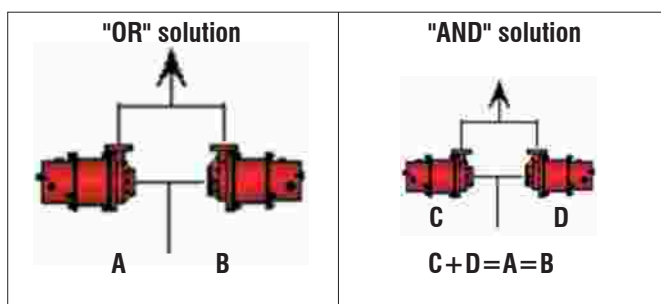
Connected in parallel, they deliver water at the nominal flow rate when operating simultaneously.

Under partial load conditions operation is limited to a single pump, reducing the capacity by $\frac{1}{3}$ compared to the rated value and resulting in average savings of about 30% in pumping costs.

ACOUSTIC VERSIONS

S Standard execution

LL Low-Noise execution for a low noise impact



INTERCONNECTIVITY

With advanced microprocessor control it is possible to implement:

- LAN networks (up to 4 units)
- GSM kit for reading and setting data via a mobile phone
- WEB kit for reading and setting data remotely from a PC via access to the IP address of the chiller unit or network of units
- Serial cards for protocols:
 - Carel / Modbus
 - Lonworks / Trend
- WEB Hardware: Ethernet card for protocols:
 - Bacnet / SNMP
- WEB software: Ethernet board for Web interface



To request tenders for LSE chillers, fill in all the fields in the tender request form provided on the opposite page and send it to your local dealer. Below is a brief explanation of the items included in the form.

MODEL

- Identify the model on the table of the previous page depending on the required power

OPERATION

- C - cooling only
- H - reversible heat pump

VERSION

It is possible to choose from among 3 different acoustic configurations:

- **S** Standard execution
- **L** Low-Noise version for a low noise impact

POWER SUPPLY

- 400/3/50 + N
- 400/3/50 with 230V transformer for the auxiliary circuits
- 400/3/50 + N, circuit breakers
- 400/3/50 with 230V transformer 230V, circuit breakers

MICROPROCESSOR / EXPANSION VALVE

- **ADVANCED** + electronic valve
The chillers are designed to be equipped with an electronic expansion valve as a standard component. Chillers with traditional expansion valves can also be supplied on request.

WATER PUMP

- Absent
- Single pump and expansion tank
- Up-rated single pump and expansion tank
- Dual pump for combined operation (AND operating logic) + expansion tank The management of AND logic requires the use of an **ADVANCED** microprocessor controller
- Up-rated dual pump for combined operation (AND operating logic) + expansion tank The management of AND logic requires the use of an **ADVANCED** microprocessor controller
- Dual pump with rotation on a time basis (OR logic) and expansion tank (rotation on a time basis)
- Dual up-rated pump in time sequence (OR operating sequence) and expansion tank

BUFFER TANK

- Absent
- Present, integrated into the unit without modifying its overall dimensions, located on the outlet side in standard configurations.

HEAT RECOVERY

- Absent
- Partial (desuperheater) In that case, the presence of a condensation control system is mandatory.

CONDENSATION CONTROL

- Absent
- Phase cut modulating control with adjustment of air flow rate depending on the condensation pressure. Using this option enables the unit to operate in the cooling mode with air temperatures below 20°, down to a temperature of as low as -10°C.

ANTIFREEZE KIT

- Absent
- Present, units with evaporator only
- Present, units with evaporator, pump and expansion tank
- Present, units with evaporator, pump, expansion tank and buffer tank

REMOTE COMMUNICATION

- Absent
- RS485 Serial board (Modbus or Carel protocol)
- Lonworks serial care (option available only if an **ADVANCED** microprocessor controller is used)
- GSM modem kit for communication via SMS messages
- Ethernet pCOWEB board (SNMP or BACNET protocol)
- Ethernet pCOWEB board (SNMP or BACNET protocol) + HIWEB supervision software

COOLING ACCESSORIES

- Absent
- Pressure gauges

SPECIAL HEAT EXCHANGER CONFIGURATION (ON REQUEST)

- Standard
- Copper / copper heat exchangers
- Heat exchangers with cataphoresis
- Heat exchangers with corrosion-proof treatment
- Special

PACKING

- Standard
- Wooden crate
- Wooden case

INSULATION

- Absent
- Base rubber vibration dumpers
- Base spring vibration dumpers

REMOTE CONTROLLER

- Absent
- Simplified
- Base microprocessor control
- Advanced microprocessor control

INSTALLATION OF THE UNIT

- Absent
- Pair of quick couplings for water IN-OUT

ACCESSORIES

- Power factor correction capacitors
- Soft-starter kit
- Service kit (kit of sensors for quick diagnosis)
- Clock card
- ON/OFF status of the compressors
- Remote control for limiting compressor starts
- Configurable digital alarm card
- Outdoor air temperature probe for setpoint compensation
- Pressure gauges
- Regulating filter kit (solenoid and tap on the liquid line)
- Normative reference other than "97/23/EC - PED"
- Condenser protection grille

RATED TECHNICAL DATA of LSE water chillers, CS version																	
LSE...CS		374	416	456	486	536	558	618	658	748	800	900	942	1072	1202		
Power supply	V _{ph} -Hz	400V - 3 Ph - 50 Hz															
Cooling capacity	kW	366,80	413,02	454,74	488,19	532,46	562,83	615,96	657,31	734,91	799,89	898,06	950,95	1.062,94	1.202,00		
Total power input	kW	124,55	149,91	158,31	173,24	192,65	194,22	212,14	229,64	248,56	291,73	310,07	345,30	382,66	453,80		
EER		2,95	2,75	2,87	2,82	2,76	2,90	2,90	2,86	2,96	2,74	2,90	2,75	2,78	2,67		
ESEER		4,26	4,18	4,32	4,25	4,23	4,15	4,15	4,09	4,15	4,19	4,33	4,34	4,29	4,28		
Total absorbed current	A	221,32	278,17	289,93	305,96	338,46	368,53	386,89	404,79	441,86	511,81	549,74	606,69	669,51	741,7		
FLA Maximum absorbed current (without accessories)	A	270	333	362	382	400	453	480	506	540	631	670	755	792	975		
LRA Inrush current (without accessories)	A	432	476	550	558	518	569	637	648	613	738	699	828	777	1190		
No. of scroll compressors / circuits		4/2	6/2	6/2	6/2	6/2	8/4	8/4	8/4	8/4	10/4	10/4	12/4	12/4	12/4		
No. of axial fans		6			8			10			12			14		16	
Air flow rate	m ³ /h	118.913			159.453			209.054			199.974			251.304		245.895	
Water flow rate	l/h	63.090	71.039	78.215	83.968	91.584	96.807	105.944	113.057	126.404	137.581	154.467	163.564	182.825	208.136		
Pressure drop, water side	kPa	54	56	57	51	52	46	50	52	53	63	55	61	51	56		
Head available - Pumps (OR) BP (option)	kPa	154	125	176	160	128	151	125	191	155	114	180	162	147	115		
Head available - Pumps (OR) HP (option)	kPa	252	236	262	257	241	235	234	227	253	234	276	259	244	214		
Head available - Pumps (AND) LP (option)	kPa	164	143	124	114	92	160	144	133	153	126	181	158	130	86		
Head available - Pumps (AND) HP (option)	kPa	237	226	217	216	205	280	263	252	230	233	266	251	242	219		
Buffer tank	dm ³	600					1040										
Expansion tank	dm ³	50															
Vic Taulic water connections	inches	4					5					6					
Height	mm	2.650			2.650			2.650			2.650			2.650		2650	
Length	mm	3.065			4.065			5.065			6.065			7.065		8065	
Depth	mm	2.250			2.250			2.250			2.250			2.250		2250	
Sound power level L _w	dB(A)	90			91			92			92			93		95	
Sound pressure level L _p	dB(A)	62			63			64			64			65		67	
Weight without accessories	kg	2.545	2.990	3.361	3.385	3.386	4.132	4.217	4.482	4.891	5.090	5.688	5.926	6.066	7300		
RATED TECHNICAL DATA of LSE water chillers, CL version (low-noise)																	
LSE...CL		374	416	456	486	536	558	618	658	748	800	900	942	1072	1202		
Power supply	V _{ph} -Hz	400V - 3 Ph - 50 Hz															
Cooling capacity	kW	354,49	394,97	440,09	470,82	512,49	546,51	593,81	632,01	712,75	765,47	868,05	912,48	1.018,58	1.177,00		
Total power input	kW	126,95	154,67	160,50	176,58	197,61	196,17	216,16	235,28	252,28	300,85	317,33	356,02	396,71	466,50		
EER		2,79	2,55	2,74	2,67	2,59	2,79	2,75	2,69	2,82	2,54	2,73	2,56	2,57	2,52		
ESEER		4,19	4,11	4,25	4,18	4,16	4,07	4,08	4,02	4,08	4,12	4,26	4,27	4,22	4,28		
Total absorbed current	A	218,86	277,84	284,61	302,87	337,52	360,1	382,08	403	435,43	513,16	546,3	608,18	675,32	766,3		
FLA Maximum absorbed current (without accessories)	A	259	322	347	368	386	435	462	488	518	518	645	730	767	975		
LRA Inrush current (without accessories)	A	421	465	545	543	504	551	619	630	592	592	674	803	752	1190		
No. of scroll compressors / circuits		4/2	6/2	6/2	6/2	6/2	8/4	8/4	8/4	8/4	10/4	10/4	12/4	12/4	12/4		
No. of axial fans		4 / 2	6 / 2	6 / 2	6 / 2	6 / 2	8 / 4	8 / 4	8 / 4	8 / 4	10 / 2	10 / 2	12 / 2	14	16		
Air flow rate	m ³ /h	94.300			126.557			167.300			163.050			158.800		201.182	
Water flow rate	l/h	60.972	67.935	75.696	80.981	88.148	94.000	102.135	108.706	122.594	131.662	149.304	156.947	175.195	202.208		
Pressure drop, water side	kPa	50	51	53	48	47	44	47	48	51	57	51	56	47	53		
Head available - Pumps (OR) BP (option)	kPa	164	140	189	175	147	160	138	206	168	136	190	176	161	127		
Head available - Pumps (OR) HP (option)	kPa	259	246	271	266	252	244	241	234	259	245	285	271	258	225		
Head available - Pumps (AND) LP (option)	kPa	172	155	134	126	106	167	153	143	162	141	194	175	149	101		
Head available - Pumps (AND) HP (option)	kPa	243	234	224	223	214	286	272	262	239	244	274	262	254	228		
Buffer tank	dm ³	600					1.040										
Expansion tank	dm ³	50															
Vic Taulic water connections	inches	4					5					6					
Height	mm	2.650			2.650			2.650			2.650			2.650		2650	
Length	mm	3.065			4.065			5.065			6.065			7.065		8065	
Depth	mm	2.250			2.250			2.250			2.250			2.250		2250	
Sound power level L _w	dB(A)	82			83			84			85			85		92	
Sound pressure level L _p	dB(A)	54			55			56			57			57		64	
Weight without accessories	kg	2650	3110	3481	3525	3526	4312	4397	4662	4996	5195	5928	6.166	6.406	7300		

Cooling: outdoor air temperature 35°C, evaporator water temperature 12°C / 7°C
 Sound power measured according to standards ISO 3741 - ISO 3744 and EN 29614-1
 Sound pressure level measured at a distance of 10 m with a directivity factor of 2

RATED TECHNICAL DATA of LSE heat pumps, HS version (standard)

LSE...HS		374	416	456	486	536	558	618	658	
Power supply	V-ph-Hz	400V - 3 Ph - 50 Hz								
Cooling capacity	kW	366,8	413,02	454,74	488,19	532,46	562,83	615,96	657,31	
Total power input	kW	124,55	149,91	158,31	173,24	192,65	194,22	212,14	229,64	
EER		2,95	2,75	2,87	2,82	2,76	2,9	2,9	2,86	
ESEER		4,26	4,18	4,32	4,25	4,23	4,15	4,15	4,09	
Total absorbed current	A	221,32	278,17	289,93	305,96	338,46	368,53	386,89	404,79	
Heating capacity	kW	410,18	470,15	513,77	550,81	602,15	647,83	695,88	743,92	
Total power input	kW	119,44	139,77	153,63	163,39	175,67	189,49	203,84	218,18	
COP		3,43	3,36	3,34	3,37	3,43	3,42	3,41	3,41	
Total absorbed current	A	214,13	265,77	284,07	292,93	314,21	325,1	348,63	372,15	
FLA Maximum absorbed current (without accessories)	A	270	333	362	382	400	453	480	506	
LRA Inrush current (without accessories)	A	432	476	550	558	518	569	637	648	
No. of scroll compressors / circuits		4/2	6/2	6/2	6/2	6/2	8/4	8/4	8/4	
No. of axial fans		6		8			10			
Air flow rate	m ³ /h	118.913		159.453			209.054		199.974	
Water flow rate in cooling mode	l/h	63.090	71.039	78.215	83.969	91.583	96.807	105.945	113.057	
Pressure drop, water side (cooling)	kPa	54	56	57	51	52	46	50	52	
Head available (cooling) - Pumps (OR) LP	kPa	154	125	176	160	128	151	125	191	
Head available (cooling) - Pumps (OR) HP	kPa	252	236	262	257	241	235	234	227	
Head available (cooling) - Pumps (AND) LP	kPa	164	143	124	114	92	160	144	133	
Head available (cooling) - Pumps (AND) HP	kPa	237	226	217	216	205	280	263	252	
Buffer tank	dm ³	600					1040			
Expansion tank	dm ³	50								
Vic Taulic water connections	inches	4					5			
Height	mm	2.650			2.650			2.650		
Length	mm	3.065			4.065			5.065		
Depth	mm	2.250			2.250			2.250		
Sound power level Lw	dB(A)	82			83			84		
Sound pressure level Lp	dB(A)	62			63			64		
Weight without accessories	kg	2.685	3.130	3.501	3.545	3.546	4.382	4.467	4.682	

Cooling: outdoor air temperature 35°C, evaporator water temperature 12°C / 7°C

Heating: outdoor air temperature 7°C, condenser water temperature 40°C / 45°C

Sound power measured according to standards ISO 3741 - ISO 3744 and EN 29614-1

Sound pressure level measured at a distance of 10 m with a directivity factor of 2

RATED TECHNICAL DATA of LSE heat pumps, HL version (low-noise)									
LSE...HL		374	416	456	486	536	558	618	658
Power supply	V-ph-Hz	400V - 3 Ph - 50 Hz							
Cooling capacity	kW	354,49	394,97	440,09	470,82	512,49	546,51	593,81	632,01
Total power input	kW	126,95	154,67	160,5	176,58	197,61	196,17	216,16	235,28
EER		2,79	2,55	2,74	2,67	2,59	2,79	2,75	2,69
ESEER		4,19	4,11	4,25	4,18	4,16	4,07	4,08	4,02
Total absorbed current	A	218,86	277,84	284,61	302,87	337,52	360,1	382,08	403
Heating capacity	kW	408,39	467,43	510,81	547,78	598,87	644,83	692,34	739,86
Total power input	kW	115,88	136,23	148,9	158,52	170,91	183,59	197,83	212,08
COP		3,52	3,43	3,43	3,46	3,5	3,51	3,5	3,49
Total absorbed current	A	203,3	254,97	269,67	278,34	299,74	307,1	330,45	353,83
FLA Maximum absorbed current (without accessories)	A	259	322	347	368	386	435	462	488
LRA Inrush current (without accessories)	A	421	465	545	543	504	551	619	630
No. of scroll compressors / circuits		4/2	6/2	6/2	6/2	6/2	8/4	8/4	8/4
No. of axial fans		6		8			10		
Air flow rate	m ³ /h	94.300		126.557			167.300	163.050	158.800
Water flow rate in cooling mode	l/h	60.972	67.935	75.696	80.981	88.148	94.000	102.135	108.706
Pressure drop, water side	kPa	50	51	53	48	47	44	47	48
Head available (cooling) - Pumps (OR) LP	kPa	164	140	189	175	147	160	138	206
Head available (cooling) - Pumps (OR) HP	kPa	259	246	271	266	252	244	241	234
Head available (cooling) - Pumps (AND) LP	kPa	172	155	134	126	106	167	153	143
Head available (cooling) - Pumps (AND) HP	kPa	243	234	224	223	214	286	272	262
Buffer tank	dm ³	600					1.040		
Expansion tank	dm ³	50							
Vic Taulic water connections	inches	4					5		
Height	mm	2.650		2.650			2.650		
Length	mm	3.065		4.065			5.065		
Depth	mm	2.250		2.250			2.250		
Sound power level Lw	dB(A)	82		83			84		
Sound pressure level Lp	dB(A)	54		55			56		
Weight without accessories	kg	2.790	3.250	3.621	3.665	3.666	4.562	4.647	4.912

Cooling: outdoor air temperature 35°C, evaporator water temperature 12°C / 7°C
 Heating: outdoor air temperature 7°C, condenser water temperature 40°C / 45°C
 Sound power measured according to standards ISO 3741 - ISO 3744 and EN 29614-1
 Sound pressure level measured at a distance of 10 m with a directivity factor of 2