

AMICUS HT

HIGH TEMPERATURE AIR SOURCE HEAT PUMPS



KEY FEATURES

- Heating capacity ranging from 7.7 to 100.7kW
- Suitable for LTHW and DHW applications
- Low noise levels
- Operates at up to 63°C water temperature
- COP up to 4.64
- SCOP up to 4.20
- Scroll compressors equipped with "Economised Vapour Injection"
- Integral controls including:
 - BMS fault and remote on/off signal
 - Indirect water heater control / hot water priority
 - Anti-legionella programme

Lochinvar Amicus HT

High temperature air source heat pumps

Amicus HT air to water heat pumps are two pipe high temperature units capable of providing heating and/or domestic hot water at up to 63°C.

They are available in two versions:



Amicus HTS versions

These are in standard noise configuration using standard efficiency fans and EVI compressors, they can produce both heating and DHW via the activation of an external three port valve with both heating and Domestic hot water having different setpoints if required. Each unit can defrost using a reverse cycle to save the energy use of an electrical de-frost system. The heat pump can maintain its 63°C setpoint down to -2°C external air and can continue to operate down to -20°C.



Amicus HTXL versions

These are low noise versions using standard efficiency fans rotating at slower speeds utilising a larger evaporator, the EVI compressors are located within a floating frame further isolating them and reducing noise levels even further. Typically, HTXL versions are up to 10dBa quieter than the equivalent HTS version. Units can produce both heating and Domestic hot water via the activation of an external three port valve with both heating and Domestic hot water having different setpoints if required. Each unit can defrost using a reverse cycle to save the energy use of an electrical de-frost system. The heat pump can maintain its 63°C setpoint down to -8°C external air and can continue to operate down to -20°C.

Both are also available as RV versions allowing the unit to provide cooling during the summer months while also supplying domestic hot water if required via the activation of an external three port valve.

Control and protection devices

All units are supplied with the following control and protection devices: Return user water temperature sensor installed on the user inlet water temperature pipe, antifreeze protection sensor installed on the user outlet water temperature pipe, high pressure switch with manual reset, low pressure switch with automatic reset, high pressure safety valve, compressor thermal overload protection, fans thermal overload protection, pressure transducer (used to optimize the defrost cycle and the fan speed depending on the ambient conditions), flow switch and weather compensated air sensor.

Microprocessor

All units are supplied standard with microprocessor controls. The microprocessor controls the following functions: regulation of the water temperature, antifreeze protection, compressor timing, compressor automatic starting sequence and alarm reset. The control panel is supplied with a display showing all operational icons. The microprocessor is set for automatic defrost (when operating in severe ambient conditions) and for summer/winter change over. The microprocessor also manages the anti-Legionella programme, integration with other heat sources (electric heaters, boilers, solar panels etc), control of a three-port modulating valve (for diverting to DHW or heating) and both the heating circuit and DHW circuit water pumps.

Standard ancillaries

Serial Interface Card RS485

This interface card enables the controller to communicate with other devices using Modbus protocol.

Condensate Discharge Tray

The Condensate discharge tray is installed under the finned heat exchanger, it is used to collect the condensate generated during operation. The drip tray is supplied complete with an electric heating system in order to protect the tray from freezing in severe working conditions.

Anti-Freeze Kit

The Antifreeze kit includes an electric heater and heating cable wrapped around the user heat exchanger and the water pipes. It is controlled by the microprocessor.

Head Pressure Control

Head pressure control allows the unit to continue to operate at extreme high and low temperatures by modulating the fan speed.

(All Amicus heat pumps supplied in the UK will have these ancillaries fitted as standard)

Project Support

All Amicus heat pumps include commissioning as standard and an allocated Lochinvar project engineer to provide installation assistance. Including up to three site visits.

Optional ancillaries

Anti-Vibration Dampers

To be installed between the unit base and the support structure to prevent the transmission of vibration and noise, to the building.

Electronic Soft Start-Factory Fitted

The soft starter reduces the peak starting current down to a maximum of 40% of the nominal peak value.

Hydraulic Kit-Factory Fitted

This kit includes a water pump, centrifugal type, suitable for hot and cold water operation. The pump is directly controlled by the microprocessor. Also included in the hydraulic circuit are a safety valve and a fill and drain point with isolating valve.

Cascade control

The Cascade controller ensures when more than one heat pump is fitted the load is shared, it also acts as an interface between the heat pumps and on site BMS system.

Coastal Protection

This treatment is used to protect the evaporator from excessive coastal corrosion and should be specified whenever a heat pump is sited within a mile of coastal waters.

Matched domestic hot water plate heat exchangers and storage vessels

Plate heat exchangers are specially designed to work with the 5K ΔT from the air source heat pump with low temperature losses between the primary and secondary side. Storage vessels are available from 300-3000 litres.

For more information: www.lochinvar.ltd.uk/lst-direct-storage-vessels

Thermal stores

A suitable sized LBT thermal store will be quoted on all projects and are available from 300-10,000 litres. (Insert link to LBT webpage) Alternatively, if there is a requirement to pre-heat the domestic hot water our HSV thermal store can be used, this features a stainless steel domestic hot water pre-heat coil and is available from 600 to 2000 litres.

For more information: www.lochinvar.ltd.uk/hsv-thermal-store

Immersion heaters

Whether used for breakdown cover or back-up in bivalent systems we can supply a large range of immersion heaters as both inline types to support the heating function and for fitting into the domestic hot water storage vessel. Inline immersion heaters are available from 12-120kW, and domestic hot water immersion heaters are available from 6-90kW.

Boost heat pumps

For systems requiring higher temperatures Lochinvar can supply an additional boost heat pump, this can boost outlet temperatures up to 78C. this system is ideal when replacing old gas fired boilers and the radiators are not being replaced. Amicus boost is available in ten models with outputs of 30 to over 250kW.

For more information: www.lochinvar.ltd.uk/amicus-boost-water-source-heat-pumps

Bivalent systems

Lochinvar can supply a full Bivalent package alongside Amicus heat pumps including:

- Solar thermal
- Cavalier Electric water heaters
- Gas fired water heaters
- Gas condensing boilers

Technical specification HTS versions

Model		LAHP-242 HTS	LAHP-292 HTS	LAHP-432 HTS	LAHP-492 HTS	LAHP-592 HTS	LAHP-752 HTS	LAHP-852 HTS	LAHP-1002 HTS	LAHP-1202 HTS	LAHP-1454 HTS	LAHP-1654 HTS	LAHP-1854 HTS	LAHP-2154 HTS
Efficiency data - part I2														
Heating Capacity (EN14511) ¹	kW	23.8	28.4	42.2	51.1	55.0	67.7	74.5	88.7	102.0	146.0	163.0	180.0	206.0
Total Power input (EN14511) ¹	kW	5.31	6.88	8.83	12.40	13.30	16.20	18.20	21.20	25.80	35.30	41.30	43.40	52.70
COP (EN14511) ¹	W/W	4.48	4.13	4.10	4.12	4.14	4.18	4.09	4.18	3.95	4.14	3.95	4.15	3.91
Nominal flow rate	m³/h	4.16	4.96	7.34	8.88	9.73	11.92	13.10	15.58	17.95	25.24	28.55	31.25	35.9
Pressure drop across the heat pump	kPa	35.7	36.7	54.1	61.2	48.1	57.6	51.5	47.6	50.2	41.4	59.6	47.1	62.0
Design air flow rate	m³/h	8384	10170	17974	18008	18035	20018	20052	30931	39127	49111	51307	48210	57324
EcoDesign data²														
Energy Label Rating Low temperature		A+												
SCOP Low Temperature		3.96	3.77	3.39	3.33	3.49	3.70	3.62	3.61	3.60	3.63	3.57	3.69	3.63
Seasonal Efficiency Low temperature	%	155	148	133	130	137	145	142	141	141	142	140	145	142
Energy Label Rating High temperature		A+												
SCOP High Temperature		3.04	3.15	2.93	3.02	2.97	3.12	3.12	3.03	2.99	2.95	2.99	3.06	3.07
Seasonal Efficiency High temperature	%	119	123	114	118	116	122	122	118	117	115	117	120	120
Cooling Data														
Cooling Capacity (EN14511) ³	kW	22.8	29.4	36.4	45.8	53.8	62.1	74.0	77.9	90.4	126	142	155	178
Total Power input (EN14511) ³	kW	7.07	9.15	13.40	16.40	19.20	22.10	25.40	27.20	32.70	44.10	51.70	55.20	68.4
EER (EN14511) ³	W/W	3.22	3.21	2.72	2.79	2.80	2.81	2.91	2.86	2.76	2.86	2.75	2.81	2.60
Nominal flow rate	m³/h	3.86	4.99	6.19	7.81	9.18	10.60	12.65	13.32	15.45	21.49	24.27	26.51	30.46
Pressure drop across the heat pump	kPa	24.9	28.5	37.5	42.7	37.2	40.8	37.2	32.7	34.6	31.4	44.3	35.7	47.3
Design air flow rate	m³/h	8924	9661	17154	17069	16990	18847	18754	29451	37293	52151	53008	50109	57807
General data														
Refrigerant		R410A												
Compressor Type		E.V.I. Scroll												
Number of Compressors		2									4			
Number of Circuits		1									2			
Capacity steps		2									4			
Minimum capacity step	%	50	50	50	50	50	50	50	50	50	25	25	25	25
Sound power level	dB(A)	78	78	79	80	80	80	80	80	80	83	83	83	83
Sound pressure level (10m)	dB(A)	46	46	47	48	48	48	48	48	48	51	51	51	51
Minimum water content in the user circuit	litre	250	300	425	510	550	680	750	890	1026	750	820	900	1050
Electrical Data														
Power supply	V/Ph/Hz	400/3+N/50												
Maximum input power	kW	11.8	14.6	21.1	24.6	28.9	33.5	38.9	36	36	70	80	76	94
Maximum input current standard unit	A	21	24.6	36.9	42.1	47.1	56.9	69.9	70	80	120	146	148	166
Peak input current standard unit		63.3	83.8	122	152	144	171	211	211	216	234	288	289	316
Peak input current unit with soft start option fitted		42	55	74	82	88	112	139	141	147	178	218	219	241
Fuse rating (delayed)	A	32	40	100	100	100	100	125	160	200	200	200	200	200
Fans														
Type		Axial AC												
Number of fans (standard unit)	n°	1			2					3	4			

1) external air +7C 30/35 flow

2) average conditions according to EU/811/2013

3) Cooling external air +35C 12/7 flow

Technical specification HTXL versions

Model		LAHP- 252 HTXL	LAHP- 302 HTXL	LAHP- 432 HTXL	LAHP- 492 HTXL	LAHP- 602 HTXL	LAHP- 752 HTXL	LAHP- 852 HTXL	LAHP- 1002 HTXL	LAHP- 1202 HTXL	LAHP- 1454 HTXL	LAHP- 1654 HTXL	LAHP- 1854 HTXL	LAHP- 2154 HTXL
Efficiency data - part I2														
Heating Capacity (EN14511) ¹	kW	26.4	29.0	41.2	49.1	57.4	65.5	80.0	87.5	101.0	148.0	167.0	187.0	219.0
Total Power input (EN14511) ¹	kW	5.48	6.36	9.56	12.30	12.80	15.10	18.40	20.10	23.80	33.70	38.90	42.90	51.10
COP (EN14511) ¹	W/W	4.82	4.56	4.31	3.99	4.48	4.34	4.35	4.35	4.24	4.39	4.29	4.36	4.29
Nominal flow rate	m³/h	4.61	5.06	7.19	8.55	10.16	11.56	13.90	15.18	17.68	25.69	28.96	32.50	37.84
Pressure drop across the heat pump	kPa	35.8	39.1	26.5	28.5	22.6	24.7	34.5	48.6	44.2	42.8	61.3	51.1	67.1
Design air flow rate	m³/h	8726	9496	13005	13968	15311	16159	28087	28922	30515	54375	56250	69261	72169
EcoDesign data²														
Energy Label Rating Low temperature		A++												
SCOP Low Temperature		3.85	3.84	3.84	3.83	4.03	4.01	3.83	3.91	3.84	3.93	3.90	3.88	3.88
Seasonal Efficiency Low temperature	%	151	151	151	150	158	158	150	153	151	154	153	152	152
Energy Label Rating High temperature		A+	A+	A+	A+	A++	A+	A+	A++	A+	A+	A+	A+	A+
SCOP High Temperature		3.00	3.07	3.19	3.17	3.31	3.27	3.13	3.21	3.18	3.25	3.30	3.29	3.33
Seasonal Efficiency High temperature	%	117	120	125	124	129	128	122	126	124	127	129	129	130
Cooling Data														
Cooling Capacity (EN14511) ³	kW	27.4	26	36.8	45.5	52.1	62	71.9	77.6	89.5	126	143	159	184
Total Power input (EN14511) ³	kW	4.48	9.04	13.3	16.3	18.9	21.8	23.8	26.5	32.7	41	48.2	49.6	61.1
EER (EN14511) ³	W/W	6.12	2.88	2.77	2.79	2.76	2.84	3.02	2.93	2.74	3.07	2.97	3.21	3.01
Nominal flow rate	m³/h	4.65	4.41	6.25	7.74	8.88	11.56	12.29	13.26	15.30	21.62	24.54	27.14	31.56
Pressure drop across the heat pump	kPa	25.4	28.7	23.6	21.1	16.1	24.7	25.3	33.5	29.8	31.7	45.2	37.6	49.4
Design air flow rate	m³/h	9136	9743	13853	13968	15311	16159	30312	31461	31431	59415	61628	75052	79208
General data														
Refrigerant		R410A												
Compressor Type		E.V.I. Scroll												
Number of Compressors		2			2						4			
Number of Circuits		1			1						2			
Capacity steps		2			2						4			
Minimum capacity step	%	50	50	50	50	50	50	50	50	50	25	25	25	25
Sound power level	dB(A)	72	72	73	74	74	74	74	75	75	79	79	80	80
Sound pressure level (10m)	dB(A)	40	40	41	42	42	42	42	43	43	47	47	48	48
Minimum water content in the user circuit	litre	250	300	425	510	550	680	750	890	1026	750	820	900	1050
Electrical Data														
Power supply	V/Ph/Hz										400/3+N/50			
Maximum input power	kW	11.7	14.5	20.7	24.3	28.5	33.2	39.3	41.3	47.3	67.7	78.5	85.1	94.7
Maximum input current standard unit	A	22	25.6	35.9	41.1	46	56	71.9	72.9	83.7	117	144	152	169
Peak input current standard unit		64.3	84.8	121	150	143	170	213	214	214	231	285	293	300
Peak input current unit with soft start option fitted		44	57	72	80	94	114	143	143	143	171	211	217	238
Fuse rating (delayed)	A	32	40	100	100	100	100	125	160	200	200	200	200	200
Fans														
Type		Axial AC												
Number of fans (standard unit)	n°	2									4		6	

1) external air +7C 30/35 flow

2) average conditions according to EU/811/2013

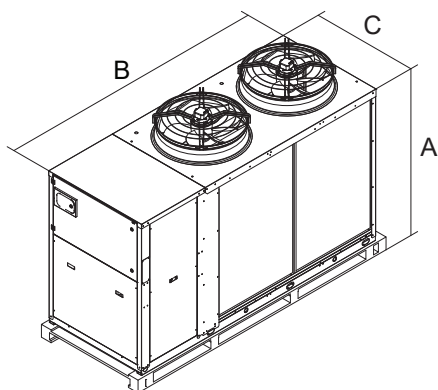
3) Cooling external air +35C 12/7 flow

Installation

General

The Amicus air source heat pump should be sited in an area which:

- Can bear the weight of the unit.
- Has enough space around the unit to allow the correct airflow across the source heat exchanger.
- Is not too windy.
- Does not present a noise nuisance to users of the building and neighbours.



Dimensions			LAHP-242 HTS	LAHP-292 HTS	LAHP-432 HTS	LAHP-492 HTS	LAHP-592 HTS	LAHP-752 HTS	LAHP-852 HTS	LAHP-1002 HTS	LAHP-1202 HTS	LAHP-1454 HTS	LAHP-1654 HTS	LAHP-1854 HTS	LAHP-2154 HTS
Height	A	mm	1494	1494	1673	1673	1673	1839	1839	1750	1750	2350	2350	2350	2350
Length	B	mm	1915	1915	2400	2400	2400	2905	2905	3900	3900	5300	5300	5300	5300
Width	C	mm	875	875	1145	1145	1145	1146	1146	1150	1150	1150	1150	1150	1150
Shipping weight	Kg		560	560	610	650	740	890	910	1190	1190	2500	2540	2580	2620

Dimensions			LAHP-252 HTXL	LAHP-302 HTXL	LAHP-432 HTXL	LAHP-492 HTXL	LAHP-602 HTXL	LAHP-752 HTXL	LAHP-852 HTXL	LAHP-1002 HTXL	LAHP-1202 HTXL	LAHP-1454 HTXL	LAHP-1654 HTXL	LAHP-1854 HTXL	LAHP-2154 HTXL
Height	A	mm	1468	1468	1673	1673	1820	1820	1920	1890	1890	2360	2360	2360	2360
Length	B	mm	1915	1915	2400	2400	2905	2905	2905	2905	2905	4205	4205	4205	4205
Width	C	mm	875	875	1145	1145	1150	1150	1150	1150	1150	2190	2190	2190	2190
Shipping weight	Kg		570	590	720	730	1080	1090	1140	1170	1250	2500	2540	2580	2580

Minimum clearances for a single unit

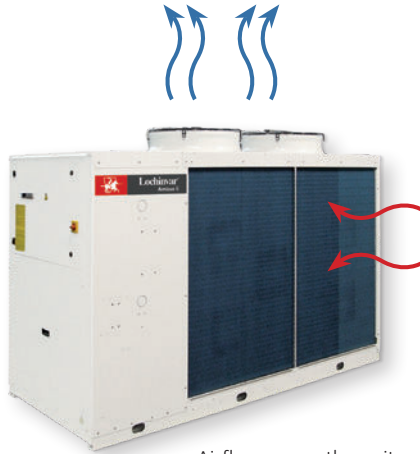
Legend	Unit	LAHP-242 HTS	LAHP-292 HTS	LAHP-432 HTS	LAHP-492 HTS	LAHP-592 HTS	LAHP-752 HTS	LAHP-852 HTS	LAHP-1002 HTS	LAHP-1202 HTS	LAHP-1454 HTS	LAHP-1654 HTS	LAHP-1854 HTS	LAHP-2154 HTS
A	mm	1000	1000	1500	1500	2000	2000	2000	2000	2000	2000	2000	2000	2000
B	mm	800	800	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
C	mm	800	800	1000	1000	1000	1000	1000	1000	1000	1500	1500	1500	1500
D	mm	800	800	1000	1000	1000	1000	2000	2000	2000	2000	2000	2000	2000
E	mm	3000	3000	3000	3000	5000	5000	5000	5000	5000	5000	5000	5000	5000
F *	mm	350	350	350	350	350	350	350	350	350	350	350	350	350

Legend	Unit	LAHP-252 HTXL	LAHP-302 HTXL	LAHP-432 HTXL	LAHP-492 HTXL	LAHP-602 HTXL	LAHP-752 HTXL	LAHP-852 HTXL	LAHP-1002 HTXL	LAHP-1202 HTXL	LAHP-1454 HTXL	LAHP-1654 HTXL	LAHP-1854 HTXL	LAHP-2154 HTXL
A	mm	1000	1000	1500	1500	2000	2000	2000	2000	2000	2000	2000	2000	2000
B	mm	800	800	800	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
C	mm	800	800	800	1000	1000	1000	1000	1000	1000	1500	1500	1500	1500
D	mm	800	800	800	1000	1000	1000	2000	2000	2000	2000	2000	2000	2000
E	mm	3000	3000	3000	3000	5000	5000	5000	5000	5000	5000	5000	5000	5000
F *	mm	350	350	350	350	350	350	350	350	350	350	350	350	350

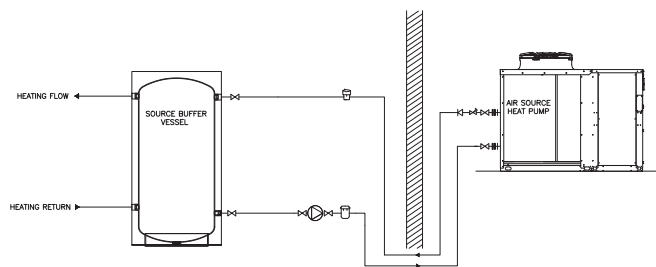
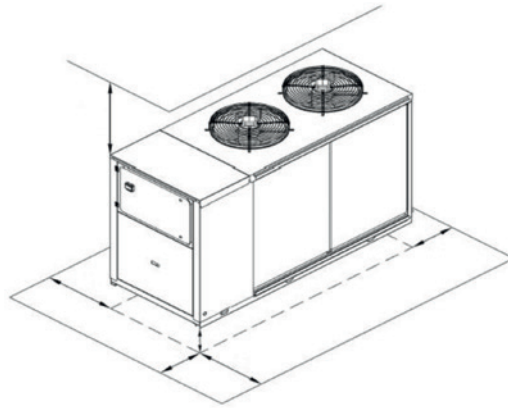
Further information is available in our Amicus HT Planning guide, available at www.lochinvar.ltd.uk/amicus-air-source-heat-pumps.

Positioning on site

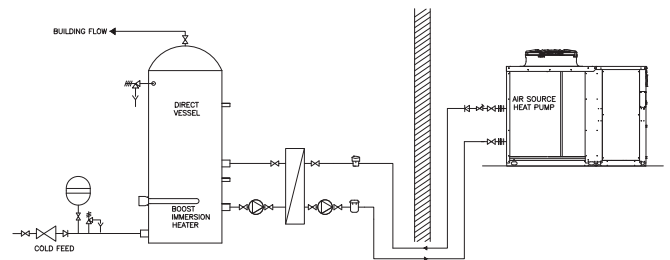
Amicus air source heat pumps require minimum clearances around them to enable the fan which is fitted on top of the unit to draw sufficient air through the source heat exchanger (evaporator) which can be fitted either just to one side of the unit or both sides depending on size and model type. Clearances also prevent exhaust air recirculation which can create operational problems for the units.



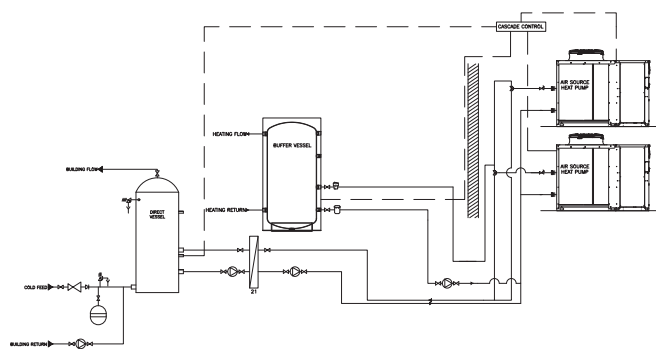
Airflow across the unit



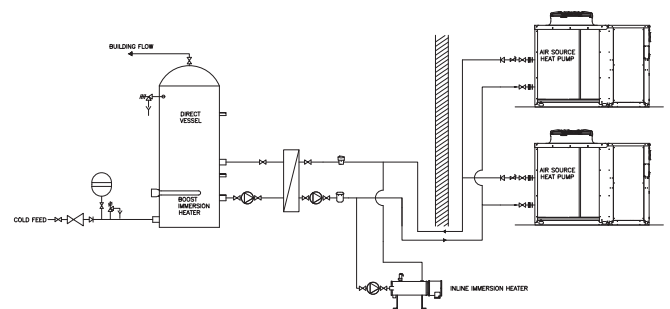
Amicus providing heating only



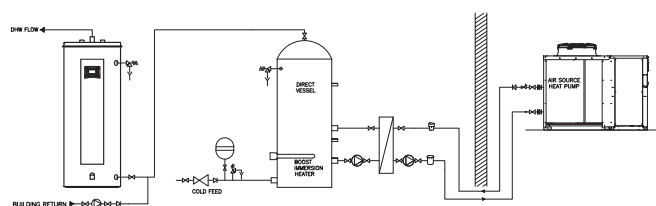
Amicus providing domestic hot water only



Amicus providing both heating and domestic hot water



Amicus providing heating only with inline immersion heater support



Amicus providing pre-heat to Cavalier electric water heater

Design criteria

Lochinvar can provide assistance in sizing your Amicus heat pump, in order to help we will require the following minimum information:

1. Heat loss of the building
2. Design outside air temperature
3. Flow temperature for the heating system
4. Domestic hot water load or number of outlets so we can help size the hot water load
5. Minimum number of heat pumps required
6. Will this be a standalone or bivalent system?
7. What will be the secondary heat source required for bivalent systems?

Case study Aston University

Key Equipment Supplied:

- 2 x LAHP-1202HT heat pumps
- 3 x LST 550GE Vessels

Lochinvar have provided two Amicus high temperature (HT) air source heat pumps connected to three hot water storage vessels as part of a major upgrade of the domestic hot water system serving the main building of Aston University in Birmingham.

Founded in 1895, Aston became the UK's first college of advanced technology in 1956 and has been a leading institution for practical learning ever since. Last year it announced a new strategy to focus more heavily on engineering, business, and health education – and this has been matched by an ambition to make its buildings good examples of low carbon engineering.

The university has already secured ISO 14001 and ISO 5001 certifications and was awarded Eco-campus Platinum status for its environmental and energy management systems. As part of its ongoing improvement programme, it has put Lochinvar's heat pumps at the heart of a new low carbon system with the university expecting to save more than 20,000kg of CO₂ annually as a result.

The heat pumps are a low carbon solution that allows the main building to operate independently of Aston's existing district heating system and can produce flow temperatures up to 63°C.

Amicus HT heat pumps use the principle of Communised Vapour Injection to improve both output and efficiency. They can achieve a Coefficient of Performance (COP) up to 4.4 and are 25% more efficient than standard scroll compressor driven systems. They will also operate in outside temperatures as low as -20°C.

Amicus heat pumps can be used as stand-alone replacements for conventional heating products or as part of an integrated system providing pre-heated mains cold water to gas-fired condensing boilers, water heaters and buffer vessels in buildings with large heating or hot water demands.

www.lochinvar.ltd.uk/aston-university-turns-to-lochinvar-for-low-carbon-hot-water

Energy label, product fiche and ErP data table are available at www.lochinvar.ltd.uk

For further information on the Amicus HT heat pumps, including ICM & user instructions and our full warranty terms and conditions, please visit our website: www.lochinvar.ltd.uk



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www.lochinvar.ltd.uk

Lochinvar Ltd reserves the right to change specifications without prior notice

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